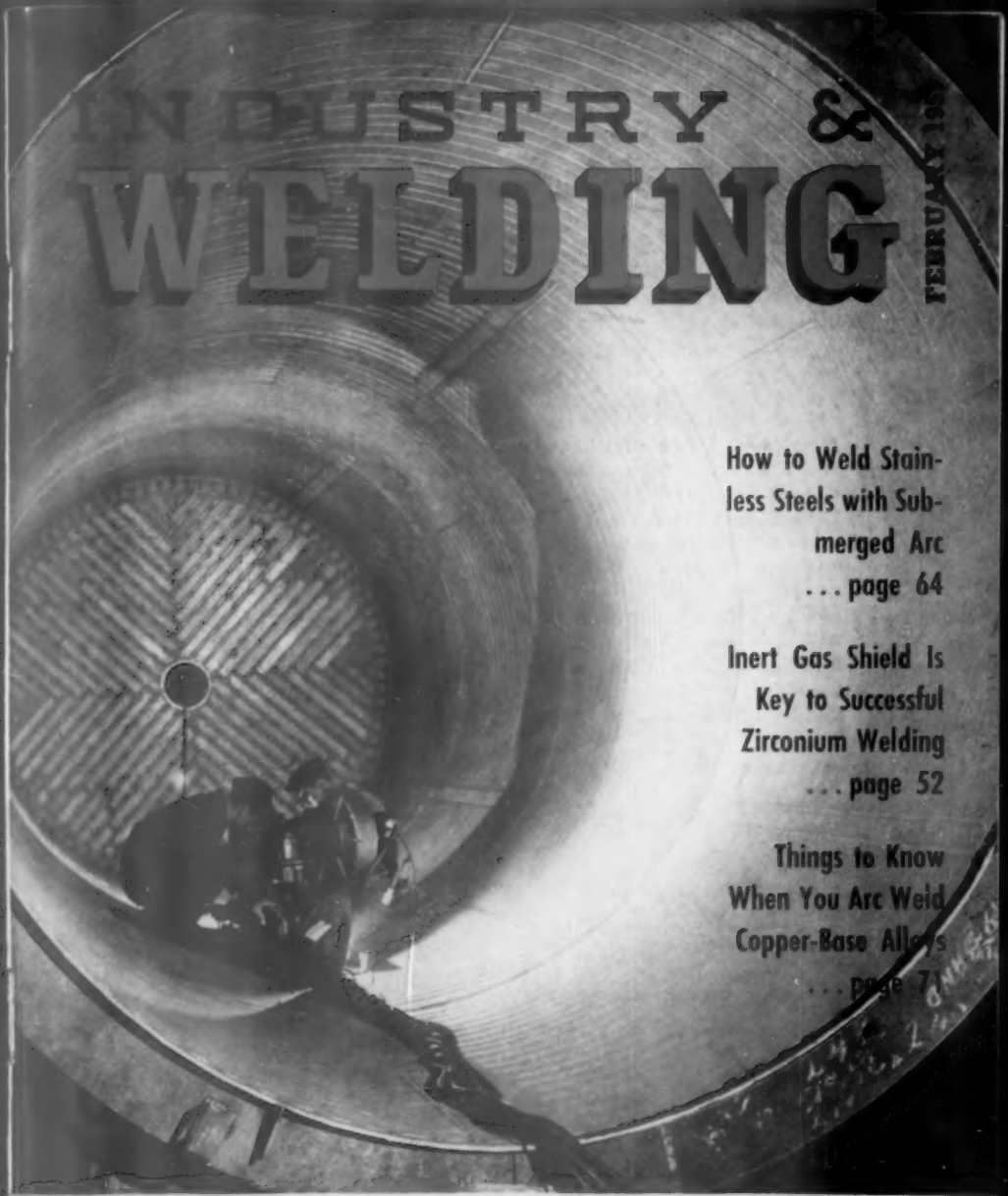
INDUSTRY & WELDING

FEBRUARY 19



How to Weld Stainless Steels with Submerged Arc ... page 64

Inert Gas Shield Is Key to Successful Zirconium Welding ... page 52

Things to Know When You Arc Weld Copper-Base Alloys ... page 71

FRANCHISED CIRCULATION

More than 40,000 welding users read this issue for practical help with their welding problems

AN INDUSTRIAL PUBLISHING CORPORATION MAGAZINE

New 'Quik-Trik' Cable Connectors by Jackson

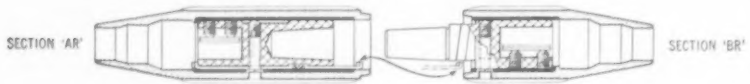
New Neoprene rubber insulators, strongly built around steel sleeves, have tapered ends to stretch over the welding cable snugly. They lock out moisture, oil and dirt, don't catch against obstructions.

Economical to install. No capital equipment is needed, no time consuming vulcanizing. Simply loosen an Allen screw, slide off the insulator and slip it over the cable end. Then connect the cable as usual, either mechanically or by soldering or brazing. Slide back the insulator and tighten.

Model 2/0-R, as illustrated, takes cables 1/0 and 2/0, mechanical, soldered or brazed connection.

Model 4/0-R takes cables 3/0 and 4/0, soldered or brazed connection only.

Section BR (male) of model 2/0-R can be used with section AR (female) of model 4/0-R where the use of different sizes of cables may be desired.



Really 'Quik-Trik'

For a quickly detachable connection, there never was a better metal-to-metal contact than is provided by these smoothly machined tapers drawn tightly together. And now, these new Neoprene insulators are tapered together in the same way. With a twist of the hand, a steel locking bar rides a cam to lock the sections together.

Always fasten section AR (female) to the cable leading from the machine. The live cable end is then well insulated even when detached from section BR (male).

The new Neoprene insulators are recommended for use with the 2/0 and 4/0 Quik-Trik Connectors now in service.

CHECK NOW. Look over your welding cables for costly current leaks and makeshift connections. You'll be money ahead by having Jackson's Ground Clamps, Cable Connectors, Splicers and Lugs stand guard against power losses and accidents all along your cable lines.

Jackson Products

AIR REDUCTION SALES CO. A Division of AIR REDUCTION CO., INC.

WARREN · MICHIGAN

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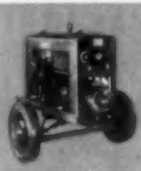
You need these NEW labor saving units to cut costs

For production minded men that are constantly checking for better ways of combatting rising costs—here's how Hobart can help you ease some of your problems. Whether it's welding, cutting and gouging, or heat treating and stress relieving, you'll be amazed at the advancements in Hobart equipment design that let you realize bigger savings.

Gas Drive



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AC/DC Welder

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NEW HOBART arc welders

. . . bring new production speeds . . . lower costs!

With these new Hobart Arc Welders—you'll not only be able to set new performance records with lower production costs—but you'll like the "simplified" controls and new ease of handling. Hobart offers advanced designs that speed your production and lower your costs. That's why leading plants everywhere are so enthusiastic about Hobart Welders. A wide selection of types and sizes lets you choose just the right welder for your particular requirements. Try a Hobart—see for yourself how Hobart will work for you. HOBART BROTHERS Co., Box HW-27 Troy, Ohio—'Phone FEderal 2-1223.

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"one of the world's largest builders of arc welding equipment"

NEW **Cutting and gouging affords amazing savings** . . . running as high as 70 to 80% in some cases. It will pay you to investigate Hobart.

HOBART

NEW **Induction type pre-heat and stress relief unit** . . . 400 cycle high frequency, fully automatic unit brings many new advantages over 60 cycle conventional methods.

Automatic Submerged Arc Welding

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All types of automatic and semi-automatic welders

No more complicated installations necessary. Hobart's "simplified" controls eliminate delicate and troublesome electronic controls. Investigate —see how easy you can profitably use automatic or semi-automatic arc welding on your own work.

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- ☐ Automatic welding
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- ☐ AC/DC Welder
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- ☐ Combination Power & Welder

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☐ Send latest catalog on Arc Welding Electrodes.

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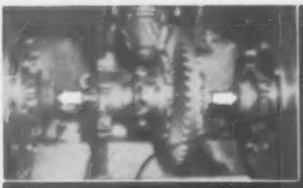

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A manufacturer used EutecTrode 680 AC-DC to modernize 11 outmoded transmissions on earth moving equipment and saved $300,000 in replacement costs. EutecTrode 680 AC-DC's high tensile strength (up to 120,000 psi) and low application temperature permitted welding at points of great torque and strain (arrows). Welds have exhibited perfect resistance to impact and wear.

EutecTrode 680 AC-DC is only one of the more than 150 research-produced Eutectic "Low Temperature Welding Alloys"® that minimize or completely eliminate warping, stress, distortion, embrittlement caused by conventional high heat welding materials.

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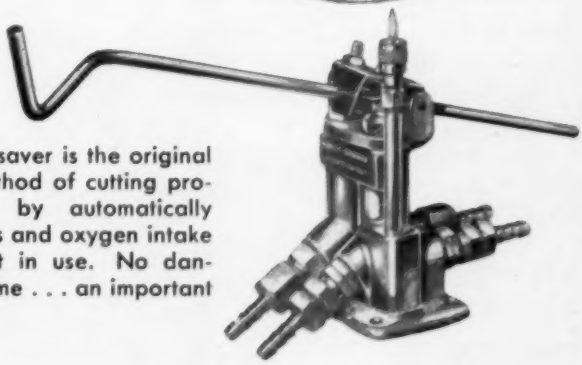
Weldit

THE WORLD'S FINEST GASAVER USED the WORLD OVER!



The Weldit Gasaver is the original gas saving method of cutting production costs by automatically shutting off gas and oxygen intake lines when not in use. No dangerous idle flame . . . an important safety feature.

Canadian Dist. Alloy Metal Sales, 181 Fleet St., E., Toronto 5, Ont.

Weldit INC. SINCE 1918

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FEBRUARY 1957 - VOL. 30 - NO. 2

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COMFORTABLE

This NEW single-cup "Solo goggle" fits easily over Spectacle goggles and personal prescription glasses *for extra protection*. Molded of light, rugged plastic, "Solo goggle" is flame resistant and non-irritating to the skin. A *patented spring retainer* makes the filter lens and cover glass easy to change. The spring is of one-piece design . . . SAFE because it has no sharp ends or edges. "Solo goggle" affords a full, unobstructed view of work! *Order this newest and best eye protection NOW from your Safety and Welding Distributor!*

THE FIBRE-METAL PRODUCTS COMPANY
CHESTER PENNSYLVANIA

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You get faster "burn off"

with P&H high speed **Iron Powder** electrodes

P&H IRON POWDER electrodes with their faster deposition rates enable you to cut costs by reducing welding time. Weldors find it easy to make excellent welds by simply dragging the rod. Welds are X-ray quality, practically self-cleaning, with excellent bead appearance and exceptionally low spatter.

Write for Bulletin R-29, "P&H Smootharc Welding Electrodes" which gives full description and specification data.

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Address: Bill Stephens, Sales Manager,

Address: Bill Stephens, Sales Manager, Welding Division, Harnischfeger Corp., Milwaukee 46, Wisconsin.

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P&H WELDERS · ELECTRODES · POSITIONERS

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The Harbormaster is a king-size power unit designed for rough use aboard barges, dredges and workboats. An Airco Oxygraph is a key production tool used to quickly and economically flame cut over 25 of its component parts from heavy steel. Airco electrodes—the Easyarc 12—are depended upon for the utmost in strength and welding speed.

Airco Electrodes & Cutting Machines

satisfy design and strength needs for unique outboard engine

The Mathewson Machine Works Inc., Boston, Mass., have been manufacturers of marine equipment since 1885. They find in building the Harbormaster that the extensive use of Airco electrodes, cutting equipment and industrial gases combine to provide them with the greatest degree of production flexibility and the widest margin of economy.

From planning to production you can rely on assistance—and completely unbiased recommendations—from Airco Technical men. For Airco is the leading supplier-manufacturer of all kinds and every type of welding and flame cutting processes, their controls, supplies and accessories.

Write to Airco for free literature on electrodes, cutting apparatus, and cutting machines.

AIRCO

AT THE FRONTIERS OF welding PROGRESS YOU'LL FIND . . .

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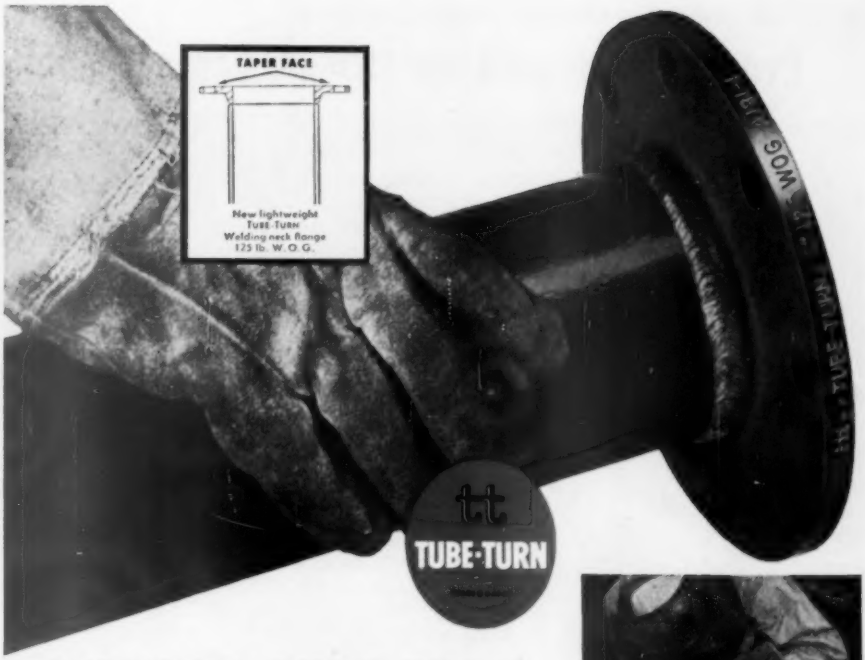


NEW! TUBE-TURN "taper face" flange

cuts cost of low pressure distribution lines

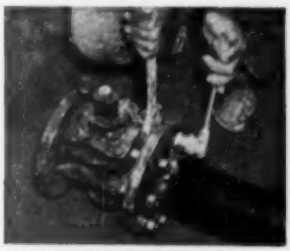
protects low pressure valves

TUBE TURNS announces a new lightweight welding neck flange for service up to 125 lb. W.O.G. pressure, offering two important cost-cutting advantages: (1) It is priced lower than conventional flanges. (2) Its tapered face affords an effective seal with reduced bolt-loading on valves; hence, permits use of forged steel butt-welding neck flanges without danger of cracking the flat-faced cast iron flanges of valves.

This Tube Turns' development can help you cut the cost of distribution lines especially when teamed up with lightweight pipe and fittings! Write for complete details.

*"TUBE-TURN" and "tt" Reg. U.S. Pat. Off.

NEW FLANGE, *teamed up with lightweight pipe and TUBE-TURN* Light Weight Fittings, offers advantage of lower price for light-duty pipe line materials.*



LOWER VALVE COSTS *can be realized because new flange permits use of low pressure valves without danger of cracking those flat-faced cast iron flanges.*

TUBE TURNS

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AT THE McLENDON MANUFACTURING COMPANY . . .

Production increased 15% on engine mounts

"By switching to this General Electric welder we have all but eliminated downtime and have increased our production 15%. Our welding section is now 100% General Electric."—J. W. McLendon, President, McLendon Manufacturing Company.

"I'm sold on the machine. It has better arc striking quality than our previous m-g sets. Anyone can strike an arc with this welder. With the added arc force you get an instantaneous start of the weld."—W. E. McWilliams, weldor.

EXECUTIVE AND WELDOR AGREE IN SPECIFYING GENERAL ELECTRIC WELDERS

Producing engine mounts that must withstand the vibration of 1500-hp, 3000-rpm engines, the McLendon Mfg. Co. demands welding equipment that gives them:

A STABLE ARC
STABILITY OF CURRENT
FLEXIBILITY OF CONTROL
ECONOMY OF OPERATION

J. W. McLendon, president of the Tulsa, Oklahoma, firm says, "After testing a 300-amp General Electric rectifier welder I suggested we standardize on them. Now our welding section is 100% General Electric."

Weldor W. E. McWilliams is pleased with Mr. McLendon's choice. "With our old welders," he says, "we had a lot of downtime for maintenance and repair. Now, as Mr. McLendon says, with G-E welders, downtime is practically zero and production is up 15%."

General Electric rectifier welders can do the same for you.

With exclusive *full-time* arc force control the weldor can use a shorter arc than is possible with any other rectifier welder and get deeper penetration.

The large, easy-to-read current scale is expanded at the lower range, allowing pinpoint setting where accuracy is essential.

For more information see your nearest General Electric Welding Distributor, listed in the yellow pages of the phone book. Or, write section 711-7E, General Electric Company, Schenectady 5, N.Y.

GENERAL ELECTRIC

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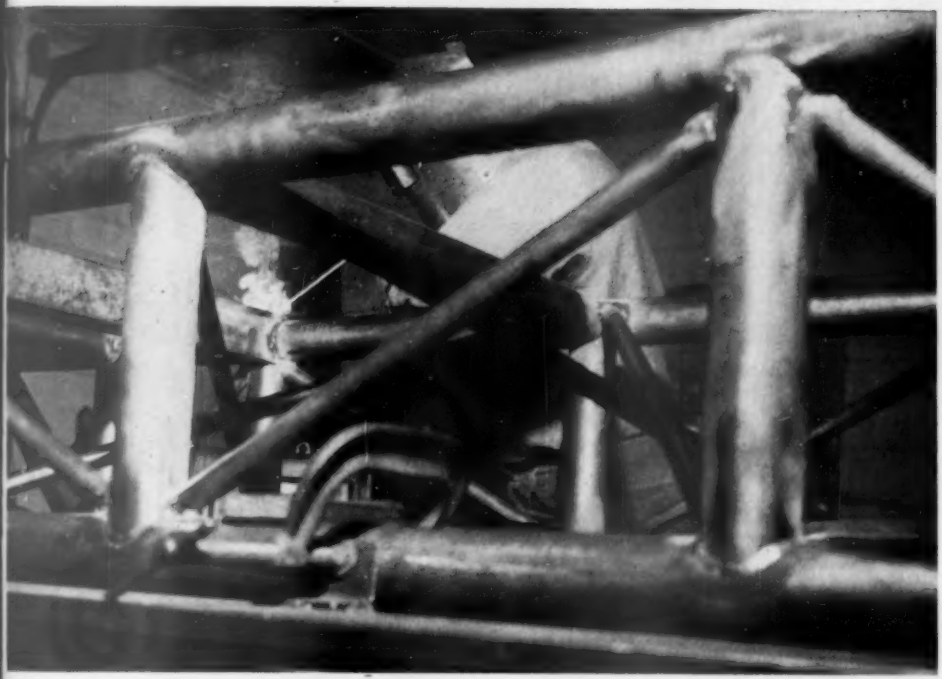
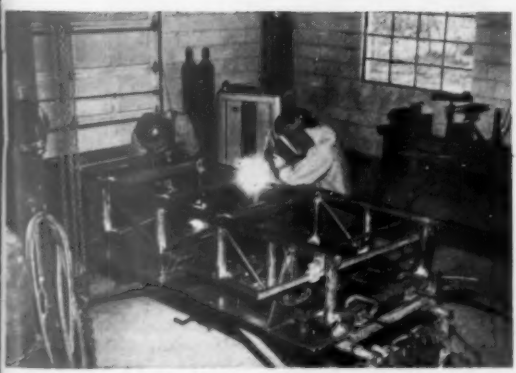
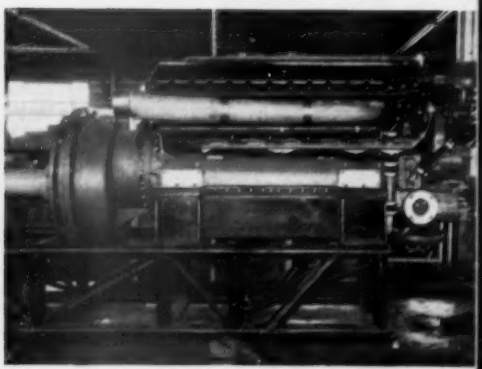
with General Electric rectifier welders





Weldors completing engine mount made of 85 pieces of tubing and 172 welds. Welds vary from 1 to 30 inches long.



A 1400 lb. engine on mount. Both units will go on a truck as part of a mobile fracturing unit to increase flow of oil wells.

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For this tough construction job on the Recreation Bowling Center in Houston, Texas, Southern Steel Erectors uses General Electric engine-driven welders.

Contractor picks General Electric welders for his tough outdoor construction jobs

R. O. Matthews, owner of Southern Steel Erectors, has specified General Electric engine-driven welders for his tough outdoor construction jobs. He has found that with the G-E equipment his company suffers no cost-consuming downtime because of repairs for welding equipment.

Some reasons for this are because on General Electric engine-driven welders:

- **Extra-heavy-gage metal construction minimizes accidental damage.**
- **No exciter is required—a potential trouble spot is eliminated.**
- **Constant-pressure brush springs and pre-set brush holders require no adjustment. Downtime is cut here.**
- **Pre-lubricated bearings all but eliminate bearing maintenance.**

Mr. Matthews also says, "we save on fuel, too; only one gallon of gas per hour. Also, the machine takes a wide range of rod sizes."

For more information contact your nearest General Electric Welding Distributor, listed in the yellow pages of the telephone book. Or write General Electric Company, Section 714-6E, Schenectady, New York.

Welder E. D. Keck has been welding 15 years with all makes of equipment. He finds that the new General Electric engine-driven welders are easiest to use and produce the best welds.

GENERAL ELECTRIC

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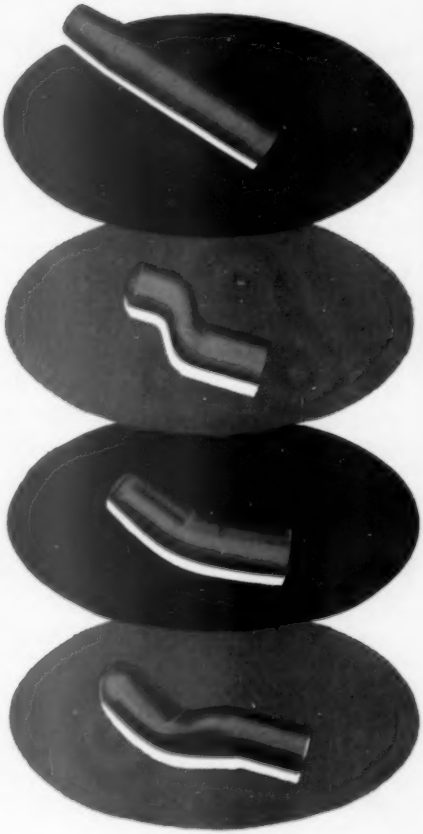
If You Use Resistance Welding...
Take a Tip From Mallory



Mallory resistance welding electrodes are available in the widest variety of stock sizes and shapes to be found anywhere. Many of the Mallory standards can actually eliminate the need for costly special electrodes. Constant Mallory research and pioneer background in the field of alloys continues to contribute increased life and better performance to a growing number of diversified users.

FAST DELIVERY is a product of a large and well rounded stock of standard electrodes. Mallory's diversified stock enables changeover and replacement units to be shipped to you on short notice.

LOWER COSTS are your benefit—brought about by the broad line of standard electrodes which often eliminate custom-built costs; and by Mallory's continuous effort to increase life and improve performance.

VERSATILITY of Mallory stock designs minimizes down time when machines are being converted to another service. Mallory's precision manufacturing holds dimensions to close tolerances, assuring complete interchangeability.

UNIFORM HIGH QUALITY of Mallory standard electrodes gives you performance dependability. You can count on Mallory for correct tapers, water tight connections, and smooth, symmetrical point forms. Every Mallory electrode is 100% inspected to insure consistently uniform, dependable service.

Write for your complete resistance welding catalog—*NOW.*

In Canada, made and sold by Johnson Matthey and Mallory, Ltd., 110 Industry St., Toronto 15, Ontario

Serving Industry with These Products:
Electromechanical—Resistors • Switches • Tuning Devices Vibrators • **Electrochemical**—Capacitors • Rectifiers Mercury and Zinc-Carbon Batteries • **Metallurgical**—Contacts • Special Metals • Welding Materials

Expect more... Get more from

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For information on titanium developments, contact Mallory-Sharon Titanium Corp., Niles, Ohio

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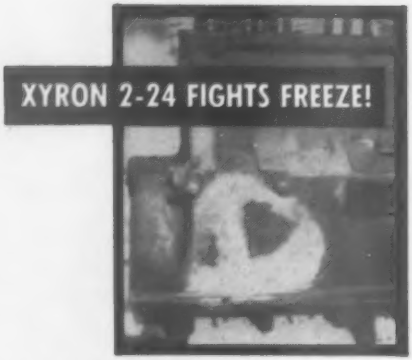

Cracked motor blocks now can be repaired in no time with Xyron 2-24 cast iron electrode. Heavy sections do not have to be dismantled because Xyron 2-24 welds cast iron "cold" in all positions. A special "Frigid Arc" flux coating makes Xyron 2-24 particularly easy to apply. Welds of Xyron 2-24 stand 50,000 psi tensile strength tests and have high resistance to wear and impact. Apply Xyron 2-24 at lowest possible amperages. Use skip welding to keep block at lowest possible temperatures. Xyron 2-24 produces dense, machinable, crack-free deposits. Less material, shorter working time mean greater economy with Xyron 2-24.

Xyron 2-24 is only one of more than 150 research-produced Eutectic "Low Temperature Welding Alloys"® that minimize or completely eliminate stress, warping, distortion and embrittlement of base metals caused by conventional high heat welding materials. Accept only genuine Eutectic "Low Temperature Welding Alloys."®

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LETTERS TO THE EDITOR

Non-Destructive Testing of Welds

Gentlemen:

I am in search of all possible information with regard to devices for the sonic testing of weldments.

I have several concerns in the area that have need for some form of low cost non-destructive testing. Your assistance will be greatly appreciated.

Donald K. Gums, Dist. Sales Mgr.
Miller Electric Mfg. Co., Inc.

Welding or Fasteners?

Gentlemen:

We are interested in the article "Which is Really Best, Welding, Bolting, or Riveting" which appeared in your July, 1956 issue. It appears that this is one field where welding will increase tremendously.

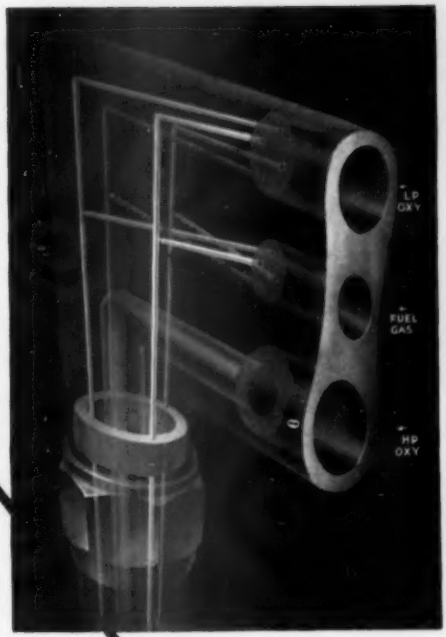
We have been told that when welding is substituted for bolting or riveting in structural steel, it is necessary to radiograph all welds to insure sound joints.

Do you know whether or not this is required by code, or if radiography is being done merely to insure safe practice?

J. W. Leask, Picker X-ray Corp.

While x-ray is not required by structural codes, designers, contractors, and inspection agencies often specify it for critical joints, in buildings with long spans, or for schools and hospitals. In most cases it is at least required that operators are qualified for x-ray quality work.

this finer cutting torch



multiple mixer in torch head... it offers greater safety and greater efficiency...

A cutting torch mixer may be located either within the torch handle, the torch tubes or the torch head. When located within the handle or the tube, the mixer is situated in close proximity to the operator's hands; no torch, however, need be held by its head.

And, besides, there is plenty of metal in that torch head to permit for an added advantage: Multiple Mixing. By breaking up the streams of the low pressure oxygen as well as the fuel gas into several separate channels, the port diameters are lessened, thus offering greater flash-back resistance.

This modern, patented Multiple Mixing in the torch head is costlier to manufacture but it eliminates the need for a separate mixer, leaky seats and joints, and years of experience in shop and field have proved the outstanding excellence of this patented design feature.

the mixer is located where it works best...and is safe.

is made by

National ... of ... california

NATIONAL welding equipment company... 218 fremont street san francisco 5 california

534-11

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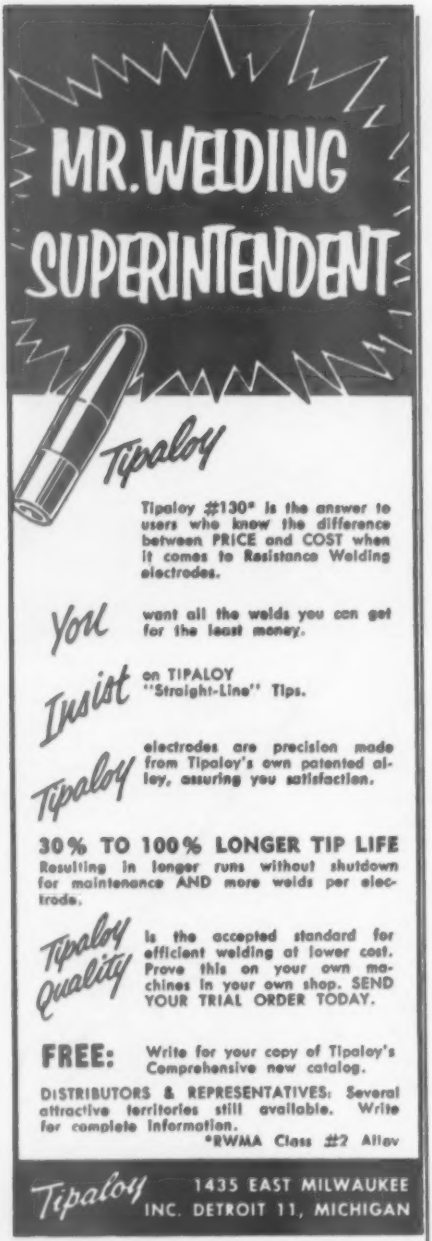
MR. WELDING SUPERINTENDENT
Tipaloy
Tipaloy #130* is the answer to users who know the difference between PRICE and COST when it comes to Resistance Welding electrodes.
You want all the welds you can get for the least money.
Insist on TIPALOY "Straight-Line" Tips.
Tipaloy electrodes are precision made from Tipaloy's own patented alloy, assuring you satisfaction.
30% TO 100% LONGER TIP LIFE
Resulting in longer runs without shutdown for maintenance AND more welds per electrode.
Tipaloy Quality is the accepted standard for efficient welding at lower cost. Prove this on your own machines in your own shop. SEND YOUR TRIAL ORDER TODAY.
FREE: Write for your copy of Tipaloy's Comprehensive new catalog.
DISTRIBUTORS & REPRESENTATIVES: Several attractive territories still available. Write for complete information.
*RWMA Class #2 Alloy
Tipaloy
1435 EAST MILWAUKEE
INC. DETROIT 11, MICHIGAN
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LETTERS TO THE EDITOR . . .

(Continued from Page 14)

Welding in Television

Gentlemen:

"Industry & Welding" and "Welding Illustrated" have been highly recommended as possible sources of valuable information which could be utilized in the type of work performed by our department. Please send copies to my attention.

T. J. Dettre
Radio Corporation of America

Sets Sights on Brazing

Gentlemen:

We are considering a change in design on one of our gun sling swivels.

This will entail brazing or silver soldering a loop of .160" wire to a ¼" formed body with a mating groove deep enough to accommodate approximately ½ the wire.

Can you recommend a source from which we can procure a silver solder or brazing flux-spelter combination which will permit brazing through joint without adding metal slug, wire or sheet.

Walter H. Bender, Supt.
Stith Mounts

WE CROSSED OUR WIRES

It has been brought to our attention that there were errors and omissions in "Comparison Chart of Gas Welding Rod, Bare Electrodes, Automatic Welding Wires and Metal Spray Wires" which appeared on pages 50-51 of the January, 1957, issue of INDUSTRY & WELDING. We regret sincerely any inconvenience or embarrassment which may have resulted.

A complete and correct comparison chart is being prepared and will appear in an early issue of INDUSTRY & WELDING.

100% X-rayed . . . 100% X-ray sound

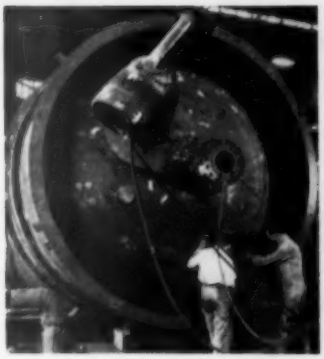
Welded with

ATOM·ARC 8016 CM

Welded by

Baldwin-Lima-Hamilton Corp.

Eddystone Division



Albert Imburgia, Welding Engineer, explains attachment welding detail on underside of reactor.

100% X-ray sound with no rewelding is a common occurrence on Atom•Arc applications. It's also a common occurrence to find the country's leading fabricators switching to Atom•Arc electrodes for welding jobs involving mild and low alloy steels. One such company is the Baldwin-Lima Hamilton Corp. of Eddystone, Penna.

Frank Iapalucci, Manager of Welding Engineering, and Carl Ascenzi, Chief Welding Engineer, have developed at Baldwin a quality control program for weldments that demands the ultimate in performance for every electrode used in their shops. Atom•Arc 8016 CM electrodes were their choice for all hand welds on this reactor for a large eastern refinery. The X-ray results proved their judgment sound.

Aside from the fact that no rewelding was required, the greater welding speed and easier operation of Atom•Arc electrodes were a great help in completing the job on schedule.

Find out how the savings and quality of Atom•Arc electrodes can benefit you. Contact your Alloy Rods Company distributor or write for informative data sheets.

Alloy Rods Co.

no finer electrodes made . . . anywhere

General Offices and Plant
Lincoln Highway West
YORK 1, PENNSYLVANIA

Pacific Coast Sales
Office and Plant
750 Lairport Street
EL SEGUNDO, CALIF.

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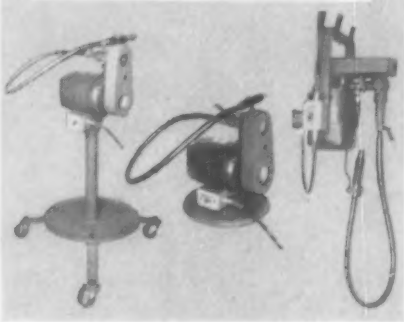
R. G. haskins Co.

FLEXIBLE SHAFT MACHINES



FASTER

Haskins machines will speed production on a big variety of metal-working jobs with their continuous speed and unerring performance. And there's no need to worry about changing tools—it takes just seconds to switch to any one of the numerous metal-working attachments in the Haskins line. *Use Haskins equipment and eliminate interruptions.*

EASIER

Haskins flexible shaft machines make the whole operation a simple matter. They're portable—ready to go to work in whatever spot you choose, even remote sections of your plant. Operators say Haskins machines are easy to use because they have to hold only the lightweight handpiece which permits greater accuracy for close, precision work. You should know about Haskins flexible shaft machines and accessories—*leaders in their field for over 30 years.*

Send for catalog and literature today

R. G. HASKINS Co.

2653 W. Harrison • Chicago 12, Illinois

Circle No. 38 on Reader Service Card.

LETTERS TO THE EDITOR . . .

(Continued from Page 16)

Resistance Welding

Gentlemen:

I wish to thank you for the tear sheets of the article entitled "Resistance Welding Joins Dissimilar Metals" which appeared in the October, 1954 issue of Industry and Welding.

We welcome the additional information in your letter concerning the Resistance Welders Manufacturers' Association as a source of further information on this particular subject.

David K. Easton, Caribbean Commission
Trinidad, BWI

Standards for Projections

Gentlemen:

Could you tell us where we may purchase or otherwise secure pamphlets on standards of projections as set up by the American Welding Society?

K. A. Swanstrom, President
Penn Engineering & Manufacturing Corp.

Experts, Take Note!

Gentlemen:

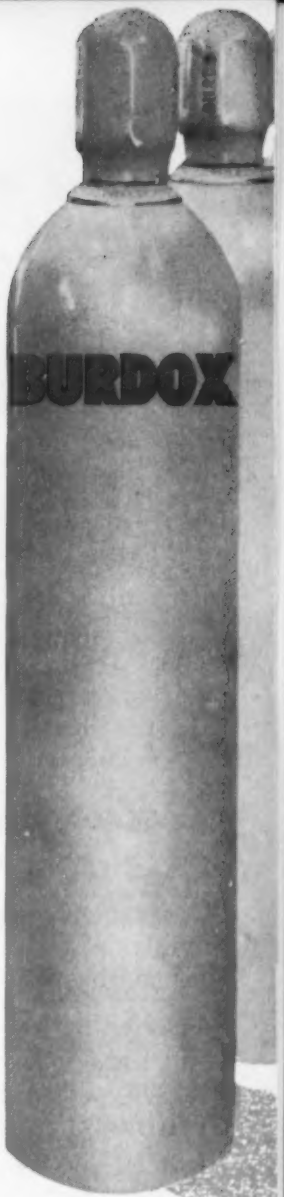
I would like to hear from anyone that can shed any light on the subject of cross wire welding, and also spot welding ALCLAD stock. Will Slope Control help?

Russell Staub
Industrial Electric Company

All requests for information and copies of articles contained in the above 'letters' were handled promptly.

Circle No. 15 on Reader Service Card. →

Wherever you see this name...



someone is saving time, money and doing a better job of

CUTTING OR WELDING

The choice of BURDOX for any welding or cutting job is the first step toward getting the best results at the lowest cost. Since BURDOX handles *all* products and processes for *all* types of welding and cutting, you can select the least costly, most adaptable, most productive process or product for *your particular requirements.* You'll find, as thousands have, that checking with BURDOX *first* guarantees better, faster, lower cost welding and cutting. Send coupon for free catalog.

Every Product... every Process to fit every Purpose *Best!*

Please send Free BURDOX Catalog

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City ..... Zone ..... State .....

MAIL COUPON TODAY!

THE BURDETT OXYGEN CO.

3333 Lakeside Ave. • Cleveland 14, Ohio

PLANTS:
Cleveland, Dayton, Findlay, Mansfield, Youngstown, Ohio and Los Angeles California

BRANCHES:
Akron, Cincinnati, Columbus, Ohio

Milwaukee

Heavy-Duty SANDER-GRINDER

5000 RPM

with EXCLUSIVE Coaster Brake CLUTCH DRIVE

UL SA APPROVED

Model U-199W

Complete with ABRASIVE wheel and Steel Grinding Guard

Only $89.50

Built Specifically *For The Welder...*

No matter how big or bulky your weld grinding, disc sanding or wire brushing jobs, you'll cut costs and speed up work when you switch to dependable MILWAUKEE power.

Powered by full 1½ HP ac-dc motor, tailor-made by MILWAUKEE to stand the gaff of every day heavy-duty service. Its high disc speed (5000 rpm) removes metal fast and because it's light weight, perfectly balanced and easy to handle, it cuts way down on operator fatigue.

Write for free folder SG2 for complete facts about this outstanding tool.

MILWAUKEE ELECTRIC TOOL CORP.

5318 W. State St. Milwaukee 8, Wis.

Circle No. 103 on Reader Service Card.

Measuring rebuilt idler at Excavators Welding Co., Westbury, Long Island

REBUILD WORN PARTS TO EXACT SIZE

with Amsco® Automatic Welding

Rebuilt Track Rollers and Idlers give twice the life of original parts

Every day more contractors and service shops are finding the cost-saving answer to tractor parts replacement. It's the Amsco "550" Automatic Welder . . . plus Amsco AW-79 alloy steel electrodes.

The rugged Amsco "550" Welder is specially designed for this heavy-duty service. It rebuilds and hard-surfaces to exact size . . . at *half the cost* of replacement parts. And service life is normally *twice* that of the original part!

Ask your Amsco Distributor for full details on the "550" Automatic Welder and the full line of Amsco Hardfacing Electrodes.

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS; JOLIETTE, QUEBEC

Circle No. 7 on Reader Service Card.

NEWS of the WELDING INDUSTRY

J. R. Thompson Joins Fibre-Metal Products

J. R. "Joe" Thompson has joined the sales staff of the Fibre-Metal Products Company, Chester, Pa. His territory will cover the North Central West from North Dakota to Indiana and includes Iowa and Nebraska. Mr. Thompson will work with welding safety supply houses on Fibre-Metal welding helmets and safety face and head protective equipment.

Announcement was made by Charles E. Bowers, Jr., sales manager.

Cincinnati A.W.S. Section Holds Welding Conference

Cincinnati Section of the A.W.S. has completed plans for its first Annual Central States Welding Conference to be held January 28-February 1 at the Sheraton-Gibson Hotel. Preliminary polling indicates that a minimum of 400 persons will attend to hear talks on welding and to see some 25 exhibit booths.

Continued Activity for Resistance Welding

The September statistical report of the Resistance Welder Manufacturers' Association indicates a continued high level of activity through the first nine months of 1956. At this point, new orders are 43 percent ahead of the same period a year ago.

Cincinnati Milling Makes Appointments

Philip O. Geier, Jr., has been appointed to the new position of Assistant Manager and Harold W. Cottrell to Sales Manager of the Cincinnati Milling Products Division, Cincinnati Milling & Grinding

GEIER

COTTRELL

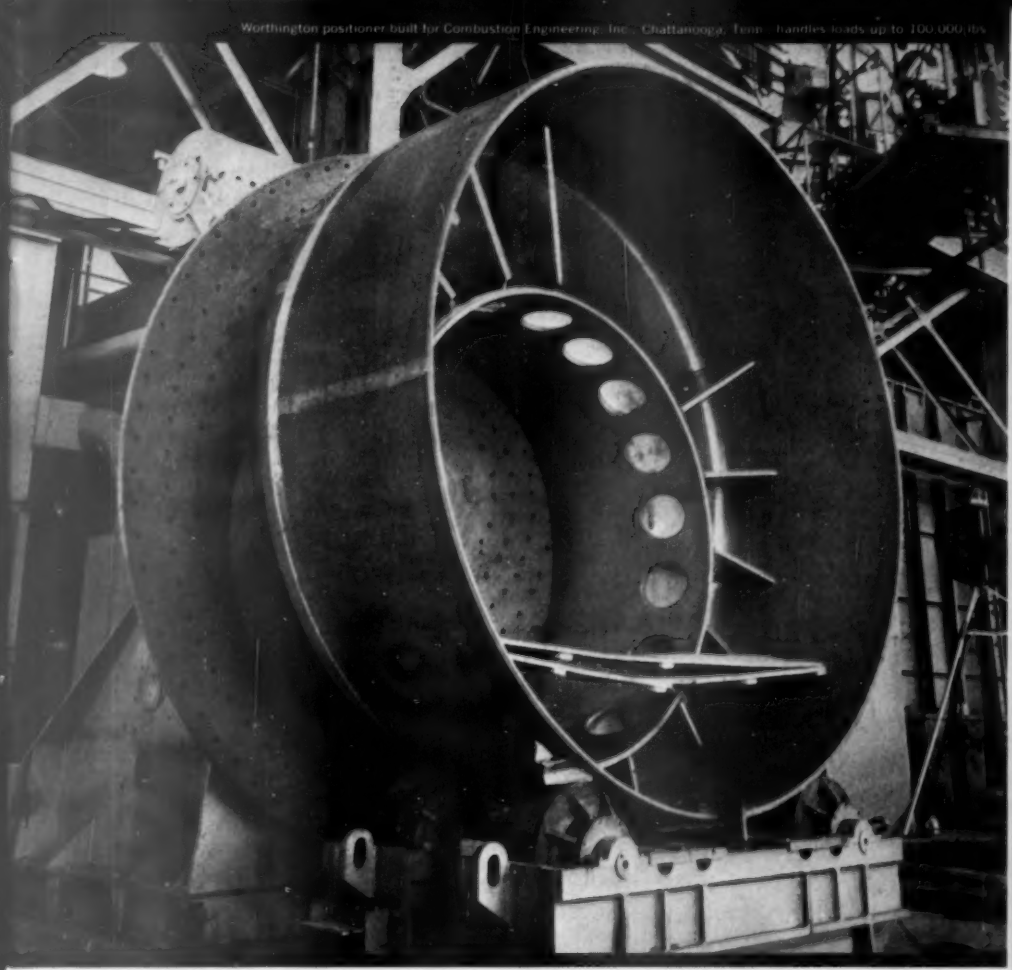
Machines, Inc. The Division manufactures grinding wheels and cutting fluids.

Worthington Names District Managers

Two new district managers have been appointed for Worthington Corp., according to a recent announcement by W. A. Meiter, corporation General Sales Manager. Appointed were E. Weston Hammond, Los Angeles District Office, and J. R. Matullo, Newark District Office.

(More News on Page 24)

Circle No. 97 on Reader Service Card. →



Worthington positioner built for Combustion Engineering, Inc., Chattanooga, Tenn., handles loads up to 100,000 lbs.

Why are more weldments handled by Worthington than all other positioners combined?

THE REASONS ARE MANY

One is good service. With distributors in all principal cities a Worthington positioning specialist is nearby to help solve your welding problems. Conservative ratings are another. Worthington engineers its positioners to deliver year after year the rating stamped on the nameplate.

Knowhow and experience complete the list. Conceived in the fabricating shop of Ransome Machine Co.—later to become an operating division of Worthington—positioners were pioneered by Worthington people for more than 25 years.

Let us help you "position for profit." For useful data on the Worthington line of positioners, automatic welding head manipulators, turning rolls, head and tailstocks, write to Section Y-72, Worthington Corporation, Harrison, New Jersey.

WORTHINGTON

LOOK FOR OUR DISPLAY IN BOOTH #207, WELDING SHOW, PHILADELPHIA, APRIL 9-11

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GEIER

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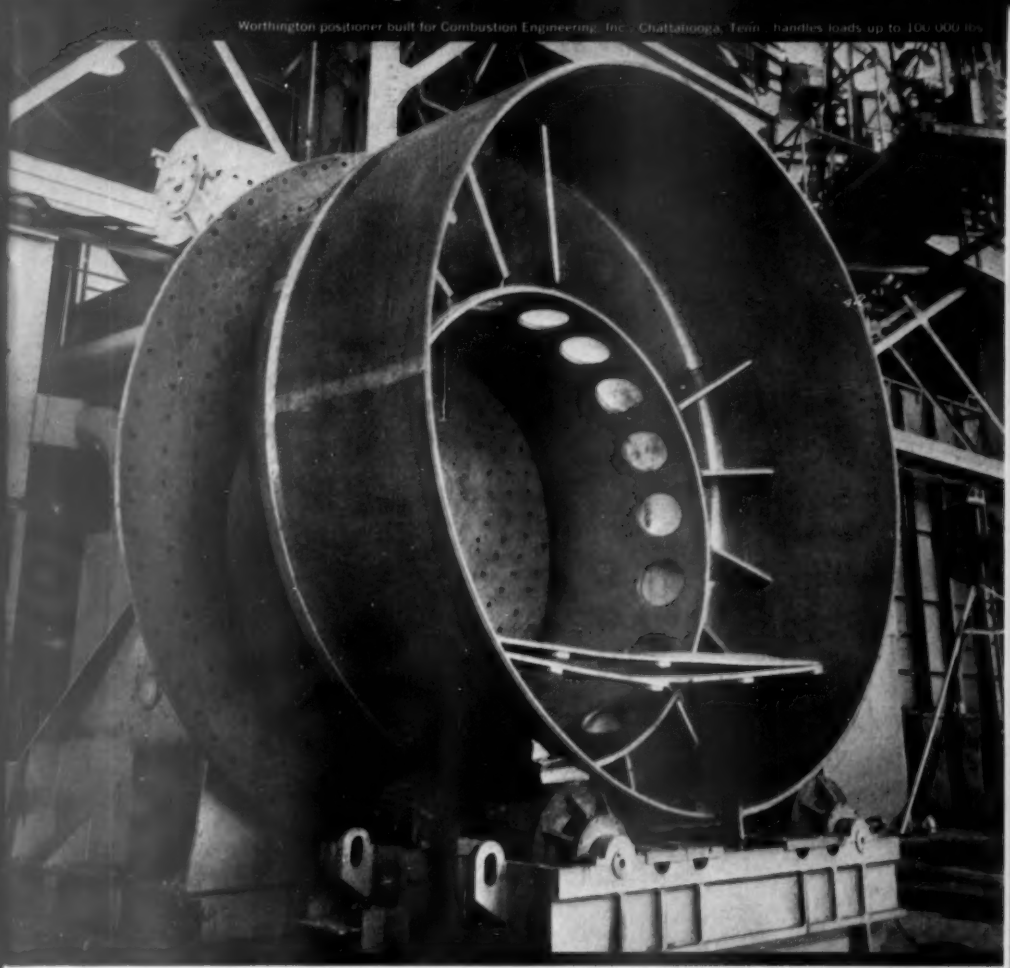

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WORTHINGTON

LOOK FOR OUR DISPLAY IN BOOTH #207, WELDING SHOW, PHILADELPHIA, APRIL 9-11

Air Reduction Names 3 Vice Presidents

Three regional vice presidents have been named by Air Reduction Sales Company to administer field activities pertaining to production, distribution and sales, effective January 1, 1957.

A. C. Brown, Jr., general sales

A. C. BROWN (left)

D. D. SPOOR (lower left)

J. J. LINCOLN, JR. (below)

manager, was named vice president-eastern region with offices in New York City; D. D. Spoor, equipment sales manager, New York, has been appointed vice president-midwestern region and will be located in Chicago, Ill.; and J. J. Lincoln, Jr., vice president, New York, will become vice president-southern region with headquarters in Houston, Texas.

USE THE READER SERVICE CARD FOR VALUABLE REFERENCE DATA

A.W.S. Holds Spring Show In Philadelphia, April 9-11

The fifth Welding Show, an industrial exposition sponsored by the American Welding Society, will be held at Convention Hall, Philadelphia, April 9-11, it was announced by Joseph G. Magrath, national secretary.

This is the first time the show is being held in a major industrial center. Previously, the show took place in Houston, Buffalo and Kansas City.

During the same week as the show, the society will conduct its annual National Spring Meeting, from April 8 to 12, at the Hotel Sheraton, in Philadelphia, when technical papers on recent research will be read.

Advance registration tickets and hotel information may be obtained from Robert T. Kenworthy, exposition management, 12 East 41 St., New York 17, N.Y.

Consumable Insert Welding Film

"Consumable Insert Welding" shows use of a special EB weld insert to join pipe by welding on one side only. The motion picture was produced jointly by Electric Boat Division of General Dynamics Corporation, builder of the world's first atomic-powered submarine, who developed the process, and Arcos Corporation, Philadelphia, who manufactures and sells the insert.

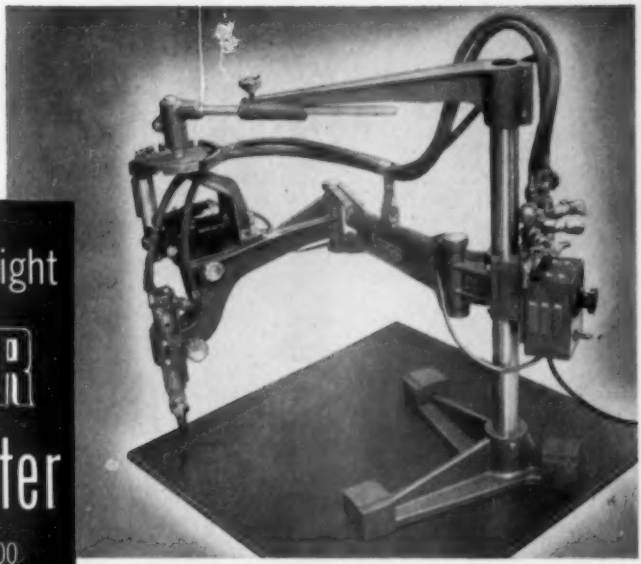
It is 16 mm, sound, color, and lasts 12 minutes and available from Harold E. Snyder, Arcos Corporation, 1500 South 50th St., Philadelphia 43, Pennsylvania.

(More News on Page 131)

New, lightweight

VICTOR Duplicutter

MODEL DC-2000



Portable Model DC-2000 cuts circles to 19½" diameter, rectangles to 12" x 35", and metals to 8" thick. Torch accommodates all Victor 1-101 and 1-100 cutting tips, through size 5.

Flame cuts parts accurately, saves handling and set-up time, increases labor efficiency.

This portable VICTOR DUPLICUTTER weighs only 36 pounds. Operator easily carries it to any work location in plant, field or warehouse . . . thus saving you time and cost of moving materials. Set-up takes minutes only. You lose no time leveling DUPLICUTTER—its magnetized feet use stock being cut as working base. And it's so simple one man easily handles production from 2 or 3 DUPLICUTTERS.

Precise controls and powerful, permanent magnet in template follower enable you to duplicate parts to production tolerances of plus or minus 1/64". Easy, quick interchange of templates makes DUPLICUTTER practical for both long production runs or duplication of single part.

Why not see for yourself how easily the VICTOR DUPLICUTTER handles, how fast and accurately it cuts? Call your VICTOR dealer NOW and ask him for a demonstration on your job . . . or write us for descriptive Bulletin 353.

For maximum efficiency and safety, use genuine Victor tips and parts

VICTOR for welding

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

30

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San Francisco 7

3821 Santa Fe Avenue
Los Angeles 58

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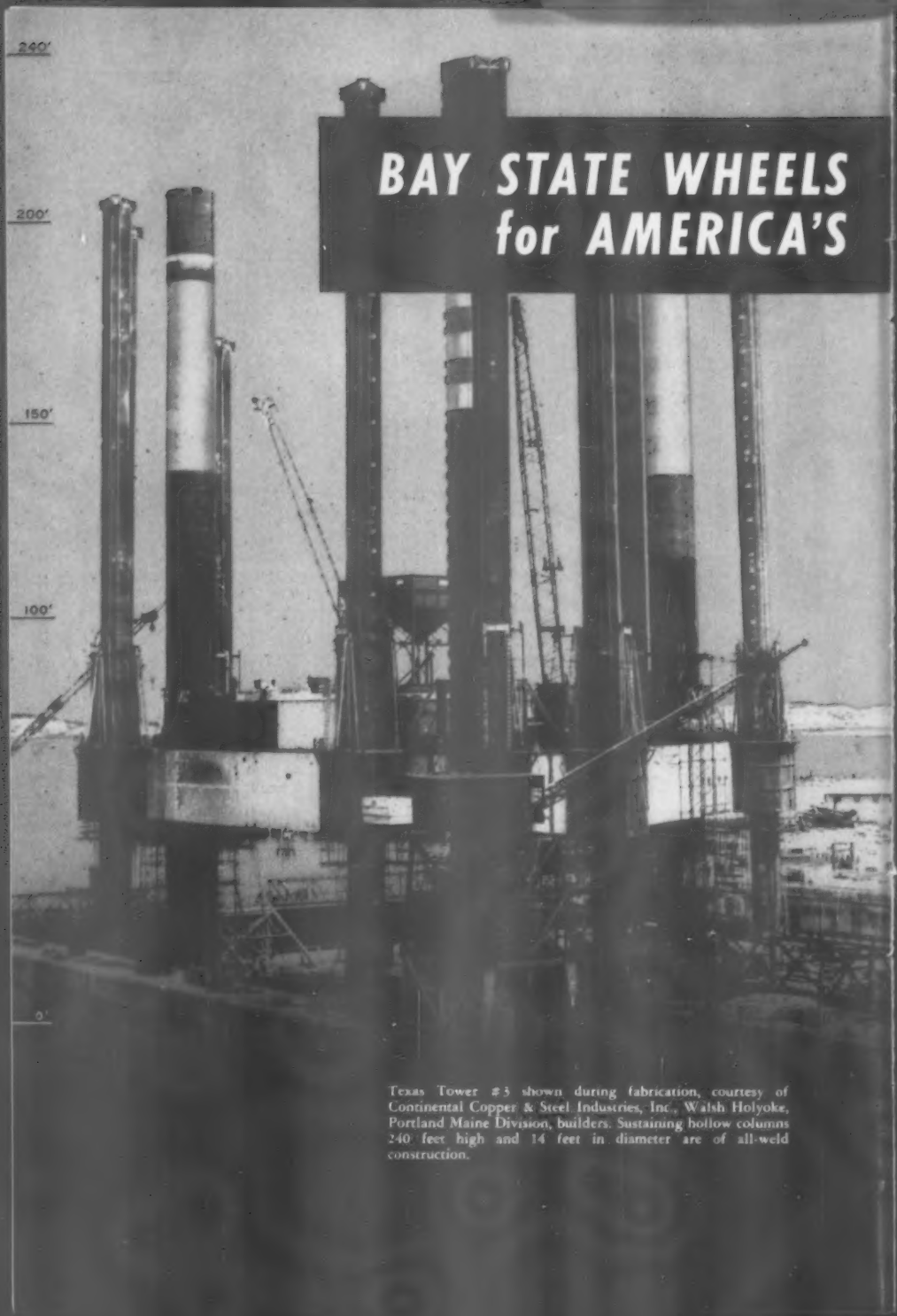


Texas Tower #3 shown during fabrication, courtesy of Continental Copper & Steel Industries, Inc., Walsh Holyoke, Portland Maine Division, builders. Sustaining hollow columns 240 feet high and 14 feet in diameter are of all-weld construction.

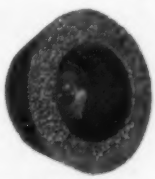
GRIND X-RAY QUALITY WELDS TEXAS TOWER #3

Welding was a primary factor in this construction and Bay State Abrasive wheels were used for the mandatory grinding of X-Ray quality welded joints.

This 6,200-Ton island of steel, now solidly rooted to the ocean's floor, was built to meet the North Atlantic's full force. No wonder that Walsh Holyoke demanded clean, uncontaminated welding surfaces for each critical joint . . . *and* the grinding wheels which could do this most efficiently!

These were *BAY STATE* wheels, which can do the same for you. Get the details from your local *BAY STATE DISTRIBUTOR*.

BLUE FLASH
Specification A-24R-BF2 used for grinding straight welds, corners, angles, and deep joints.



FLARING CUPS
Specification 3A-16Q4-BA2 used for heavy snagging of wide welds, and surface preparation on broad areas.

BAY STATE
WHEELS of PROGRESS

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Massachusetts, U. S. A.

Branch Offices and Warehouses: Bristol, Conn., Chicago, Ill., Cleveland, Ohio, Detroit, Mich., Pittsburgh, Pa.
Distributors — All principal cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

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GB Silver Brazing Alloys

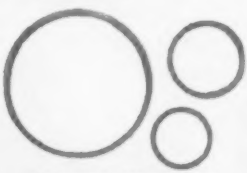
Used in Many Hospitals Where Safety Means Life or Death

Sound, leak-proof joints are a MUST in hospital construction requiring the piping of Oxygen and Anesthetic Gases to wards, rooms and nurseries *for instant use!* That's why leading designers and contractors specify dependable GB Silver Brazing Alloys, Preformed Rings and Fluxes.

GB Preformed Rings, for example, assure stronger, safer everlasting joints. They save time, require less metal, meet all specifications, cost less. Perhaps life or death are not a factor when you do silver brazing, but the dependability, efficiency and economy provided in GB products are good reasons for their choice . . . especially when they cost so little.

. . . Shown above is typical installation of oxygen wall outlet, snap coupler and flow meter. GB Preformed Rings are used to braze (1) wall assembly to screen; (2) tube to regulator; and (3) tube to gauge. For complete data write today.

GB FLUXES are fully active, deep penetrating, stable and economical. Produced under strict laboratory control they are extremely effective in producing high quality joints.



GB PREFORMED SILVER BRAZING RINGS are available in a wide range of sizes for all requirements. They are easy to use, save time and labor, assure lasting results.

GB SILVER BRAZING ALLOYS are made in random coils, strips and many special shapes in addition to preformed rings. Also available is Goldsmith's Technical Service Division cooperation for competent assistance in all brazing problems.

Dealer Distributor Inquiries Invited **Write for GB Data Book**

GB Goldsmith Bros. SMELTING & REFINING CO. Est. 1867

1300 W. 59th Street • Chicago 36, Ill. — NEW YORK • DETROIT • OAKLAND

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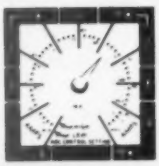
...for those tough "HARD to WELD" jobs *

VICKERS Controlarc* DC Welder

Right at your fingertips—exact control—compact, light weight for truly versatile performance

SELECTION OF ARC TYPE to suit your individuality and the welding job.



DUAL CONTINUOUS CONTROL in a rectifier welder. Can vary the current and the type of arc, with continuous stepless self-indicating dials.

*TRADEMARK

Gives You REMOTE CONTROL of Current and Type of Arc

Even in cramped places, this little remote control box goes right with you. You can "dial" the exact arc you need for any welding position, without running back to the welder to change range switches and taps. Only the Vickers CONTROLARC gives you this individual control of current and type of arc in convenient remote control operation.

AND ONLY THE CONTROLARC GIVES YOU THESE EXCLUSIVE OPTIONAL FEATURES:

- Constant Potential (CP) Adaptor
- Slope Controller

WRITE TODAY for more information on this versatile welder.

DESIGN ENGINEERS:
There are openings in our expanding program. Write for details.

VICKERS ELECTRIC DIVISION

VICKERS INCORPORATED a unit of Sperry Rand Corporation
1855 LOCUST STREET • SAINT LOUIS 3, MISSOURI

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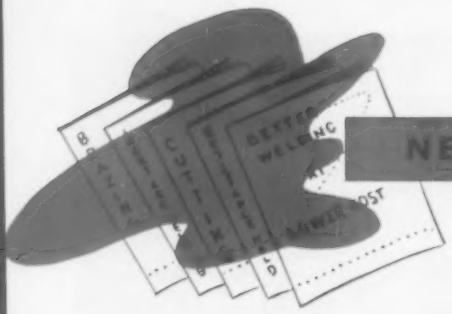


NEW REFERENCE DATA

The publications featured on these pages were written by experts. They are FREE to our readers. To obtain these helpful reference materials use postcard bound into this issue.

"BASIC TYPES OF RESISTANCE WELDERS" is the title of a colorful 10-page brochure offered by Federal Machine and Welder Co. Bulletin BT-56 describes and illustrates company's complete line of standard and special duty welders and also gives a short course in fundamentals of resistance welding. **Circle No. 110 on Reader Service Card.**

CARBON-ARC COMPRESSED AIR GOUGING, BEVELING AND GROOVING OF ALL METALS is the subject of a new 2-color, 4-page folder available from Arcair Co. Folder features numerous new applications for the company's Arcair torch and also include data on carbon electrodes for use with the torch. **Circle No. 111 on Reader Service Card.**

HYDRAULIC AND AIR-OPERATED INDUSTRIAL PRESSES of 25 to 150 ton capacity are subject of illustrated 16-page Bulletin DH-486 issued by Manley Division, American Chain & Cable Co., Inc. Detailed specifications, capacities and accessories are included for a total of 10 different models for varied industrial requirements. **Circle No. 112 on Service Card.**

HOW AND WHERE TO USE TURNING ROLLS is a brief way of summarizing the contents of 12-page bulletin issued by Aronson Machine Co. A complete line of turning rolls is featured. Operating instructions and mechanical specifications are included. **Circle No. 113 on Reader Service Card.**

A SINGLE UNIT "PICTURE WINDOW" GOGGLE for full view and maximum protection in brazing, cutting oxy-acetylene welding and grinding operations is the subject of two-page, three-color bulletin issued by Fibre-Metal Products Co. Bulletin No. 53 describes company's new "Solor goggle." **Circle No. 28 on Reader Service Card.**

LATEST BAR STOCK LIST which tells what's actually in stock in warehouse nearest you is available from U. S. Steel Supply Division USS. Specific, complete, accurate, up-to-date and easy to find data is given for cold finished — hot rolled—alloy—stainless—aluminum bar stock. **Circle No. 114 on Card.**

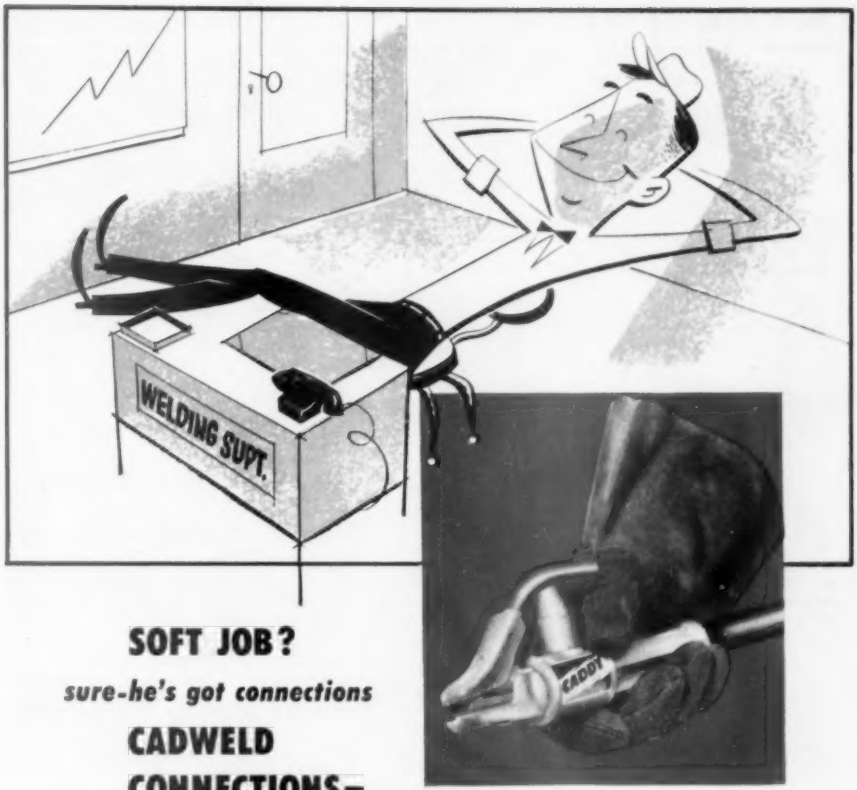
FLEXIBLE SHAFT EQUIPMENT FOR WELD GRINDING AND FINISHING is described and illustrated in literature available from R. G. Haskins Co. Other applications are suggested and accessory equipment covered. **Circle No. 38 on Reader Service Card.**

NEW CATALOG OF REINFORCED ABRASIVE PRODUCTS is currently available from Bay State Abrasive Products Co. Specific recommendations are given for the use of three basic types to reinforced products: raised hub disc wheels, abrasive cut-off wheels and resinoid straight wheels. Catalog has an easy-to-use index. **Circle No. 115 on Reader Service Card.**

SILVER BRAZING ALLOYS, RINGS AND FLUXES are the subject of data book offered by Goldsmith Bros. Smelting & Refining Co. Book gives valuable information on use of each product. **Circle No. 33 on Reader Service Card.**

APPLICATIONS FOR HEAVY DUTY AIR-COOLED ENGINES made by Wisconsin Motor Corp. are featured in the latest issue of company's "Enginews" publication. Typical and not so typical applications are described and illustrated. **Circle No. 116 on Reader Service Card.**

(Turn to Page 32)



SOFT JOB?

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CADWELD CONNECTIONS– and CADDY ARC WELDING ACCESSORIES

Equip your shop with: CADDY Electrode Holders, Ground Clamps, Quick Connectors, Lugs, all connected with the 100% efficient CADWELD Connections. Reduce: down time—hot holders—cable leaks. Give your welders the coolest holder on the market ! ! ! ! CADDY TYPE "B".

CADDY Arc Welding Accessory Div.

Erico Products, Inc.

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IN CANADA: WELDING PRODUCT SALES, Canadian General Electric Co., Ltd., 1350 Castlefield Ave., Toronto, Ontario

Circle No. 26 on Reader Service Card.

WHEELS, WHEELS AND MORE WHEELS is what you'll find in a complete 4-page, two-color catalog issued by National Welders Supply Co., Inc. Nine different types of semi-industrial and heavy duty industrial wheels are described and illustrated. Company's new portable farm and shop oxy-acetylene welding and cutting outfit is also featured. **Circle No. 117 on Reader Service Card.**

COMPLETE LINE OF ARC WELDING ELECTRODES available from Lincoln Electric Co. is lissted in Weldirectory SB-1352. Suggested applications and operating instructions are given for electrodes for use on stainless steels, non-ferrous metals and for manual hard surfacing. **Circle No. 118 on Reader Service Card.**

WELD FASTENERS FOR RESISTANCE WELDING are featured in Stock Parts Bulletin 563 issued by Ohio Nut and Bolt Co. Included in Bulletin are 78 new stock parts available for immediate delivery. Complete-listing and dimensional information on weld fasteners and adjusting screws is given. **Circle No. 119**

PIPE WELDING CLAMPS made by Jewel Manufacturing Co. are the subject of illustrated 6-page folder which contains latest effective price lists. Described and illustrated are pipe clamps, elbow clamps, welding flange clamps and pipe markers. **Circle No. 43 on Service Card.**

TUBULAR PARTS AND FITTINGS MADE OF A CHROMIUM MOLYBDENUM ALLOY STEEL are featured in folder TDC-146A available from Babcock & Wilcox Co. Folder contains technical information on pipe, tubes and welding fittings made of B&W Croloy 5 steel. **Circle No. 120 on Reader Service Card**

A PORTABLE HARDNESS TESTER is the subject of literature offered by Industrial Overlay Metals, Inc. Service bulletin from the company described and illustrates Bergstrom hardness tester and explains how it is used to determine hardness of steel alloys and other metals in range from 25 to 65 Rockwell "C" scale. **Circle No. 121 on Reader Service Card.**

AN ILLUMINATED MAGNIFIER manufactured by E. W. Pike and Co., Inc., is the subject of a 12-page bulletin now available. Bulletin features an exploded of Flash-O-Lens basic component parts and contains illustrations of all battery and electrically powered models. **Circle No. 122 on Reader Service Card.**

THERE'S SOMETHING MAGNETIC ABOUT TOOLS manufactured by Magnetic Tool Corporation. The something is what makes the company's drill press bases and plate clamps work. Literature from the company describes and illustrates company equipment which makes it easy to position pieces for welding or to attach portable drills to ferrous surfaces for drilling. **Circle No. 123 on Reader Service Card.**

COMPREHENSIVE GRINDING WHEEL NET PRICE AND DATA BOOK has been announced by the Abrasive Wheel Department, Manhattan Rubber Division of Raybestos-Manhattan, Inc. The 36-page book lists rubber and resinoid bonded wheels and provides a comprehensive picture of the sizes, shapes and types of grain available for industrial grinding wheels. **Circle No. 124 on Service Card.**

HEAD AND TAILSTOCKS FOR WELDING AND ASSEMBLY are featured in new specifications sheet available from Worthington Corp. Bulletin No. R-1700-S 19P includes specifications, general description and photographs. **Circle No. 125 on Reader Service Card.**

FLAME CUT E8615 ALLOY STEEL PLATE available from Joseph T. Ryerson & Son, Inc., is featured in catalog sheet. Company explains that flats, rings, discs and irregular shapes are flame cut from E8615 case hardening steel plate which is stocked in 72" x 240" size, in thicknesses from ½" to 6" inclusive. **Circle No. 126 on Reader Service Card.**

INFORMATION ON TWO IMPORTANT WELDING PRODUCTS is contained in folder from York Engineering Co. Described are an efficient anti-spatter compound and an all-purpose welding and brazing flux. **Circle No. 101 on Reader Service Card.**

(Turn to Page 34)

Circle No. 68 on Reader Service Card. →

For longer, faster action . . .

SIMONDS ABRASIVE CO.

GRINDING WHEELS

with

New

IL

BOND

IL Bond — Simonds new development — acts as an internal lubricant, increasing the cutting action of resinoid bonded grinding wheels. If your present cutting rate is satisfactory, this new bond in harder grade will give longer wheel life. Where wheel life is satisfactory, new IL Bond in the same grade will give longer wheel life. For the fast cutting of softer grades with the long wear of hard wheels, use Simonds wheels with new IL Bond.

SIMONDS ABRASIVE COMPANY

Tacony and Fraley Streets, Philadelphia 37, Pa.

DIVISION OF SIMONDS SAW AND STEEL CO.

BRANCHES: PHILADELPHIA, CHICAGO, DETROIT, LOS ANGELES, SAN FRANCISCO, PORTLAND, ORE.

Circle No. 68 on Reader Service Card.

ABRASIVE SNAGGING WHEELS FOR WELD SHOPS, STEEL MILLS AND FOUNDRIES are featured in a catalog ESA-62 offered by Simonds Abrasive Co. A complete line of wheels is described and illustrated. Suggested applications are given, along with operating recommendations. **Circle No. 127 on Reader Service Card.**

ABRASIVE CUT-OFF MACHINES, the best way to cut many materials, and the only way to cut some, is graphically described in a 4-page folder, Bulletin DH-460-B, recently released by Campbell Machine Division, American Chain & Cable Co., Inc. Specifications, such as model number, uses, floor dimensions, speeds, are given in a comprehensive table. **Circle No. 128 on Service Card.**

"HOW TO SOLDER ALUMINUM TO COPPER" is the title of a new two-page bulletin available from Tweco Products, Inc. Bulletin A-100 contains photographic step-by-step instructions for successfully soldering aluminum welding cable to copper terminal and copper arc welding accessories. **Circle No. 129 on Reader Service Card.**

COMPLETE STOCK OF ALUMINUM PRODUCTS carried by New York and New England steel service plants of Joseph T. Ryerson & Son, Inc., is featured in 16-page bulletin. Listed are sizes and weights of rod, bar, sheet, coil, plate, tubular and building products of Reynolds aluminum. **Circle No. 130 on Reader Service Card.**

"METALLURGICAL CONSIDERATIONS OF MAIN STEAM PIPING FOR HIGH TEMPERATURE, HIGH PRESSURE SERVICE" is a rather long title for a short and to the point article reprint offered by Tempil Corp. The reprint is based on a report by H. S. Blumberg, chief metallurgist, M. W. Kellogg Co., and is the first comprehensive review and discussion of technical literature on new superstrength alloys for main steam piping. **Circle No. 131 on Reader Service Card.**

GRINDING WHEEL SPECIFICATIONS AND MARKING DATA is featured in an illustrated bulletin prepared by Electro Refractories & Abrasives Corp. Bulletin GD-56 contains a chart explaining the system by which grinding wheels are marked according to abrasive material, grain size and combination, grade, structure and bond. **Circle No. 132 on Reader Service Card.**

TUBE AND PIPE NOTCHING TOOLS AND CUT-OFF MACHINES are described in a folder from Vogel Tool & Die Corp. Notching tools are said to make perfect joints for welding or brazing, cut clean edges and eliminate any need for further finishing. **Circle No. 86 on Reader Service Card.**

COPPER AND ALUMINUM WELDING CABLES and welder power supply cables are the subject of an illustrated 6-page folder issued by General Cable Corp. Sizes, capacities and design details are given for the company's complete line. **Circle No. 133 on Reader Service Card.**

FLUXES FOR WELDING, BRAZING, SILVER AND SOFT SOLDERING are described in latest bulletin from Krembs & Co. Applications and properties for each of these products are included, as well as, for Kop-R-Arc coated rods. **Circle No. 45 on Reader Service Card.**

A HUMOROUS APPROACH TO A NOT-SO FUNNY SAFETY PROBLEM is found in a 12-page cartoon booklet offered by E. W. Bullard Co. Attempted Murder" is the title of the booklet which explains the importance of safety head protection and "care and feeding" of hard hats. **Circle No. 134 on Service Card.**

LOWER COST WELDING AND TROUBLE-FREE OPERATION are said to be made possible with "presdwood" and hardboard spools manufactured by Carris Reels, Inc. Literature from the company describes a complete line of spools designed for coiled wire used in automatic welding operations. **Circle No. 16 on Reader Service Card.**

ELECTRONIC TUBES FOR COMMERCIAL, INDUSTRIAL AND MILITARY APPLICATIONS are the subject of a striking, two-color brochure issued by Chatham Electronics Division of Gera Corp. Bulletin describes company's line of electronic equipment, including selenium rectifiers and radiation survey instruments. **Circle No. 135 on Reader Service Card.**

(Turn to Page 36)

The new silicon rectifier means money in your pocket

. . . money you'll save because this revolutionary Westinghouse welding development has been proved by industry to be the most efficient, most durable ever offered. It's hermetically-sealed against dust, oil, water and acid fumes. And for the welding operator there's excellent performance — easier arc starting, better arc stability, maximum drive.

The new silicon rectifier is another milestone in welding, another Westinghouse *plus* that teams with "wide-amp" control and "arc-drive" control to bring you the *best* in welding equipment. J-21983

YOU CAN BE SURE...IF IT'S

Westinghouse

Circle No. 95 on Reader Service Card.

NEW LIQUID LP GAS SALAMANDER uses full tank pressure with no tank freeze up according to illustrated bulletin published by Wemco products. Model SLG salamander uses special burner which changes liquid to gas providing up to 150,000 BTU input without regulator. Literature also covers models for high or low pressure operation with efficient twin or triple burners for more complete gas combustion. **Circle No. 92 on Reader Service Card.**

"HANDBOOK OF METAL SAWING" is the title of a completely revised, 36-page book from W. O. Barnes, Inc. Handbook covers proper selection and use of hand and power hack saw blades and band saw blades. Recommended cutting speeds, feeds and techniques are also tabulated. **Circle No. 136 on Reader Service Card.**

"ARC WELD ALUMINUM AS EASILY AS MILD STEEL" is the title of a new two-color folder describing "Low Amp" EutecTrode 2101 DC, the new electrode for aluminum featuring an extruded coating introduced by Eutectic Welding Alloys Corp. Folder explains advantages of extruded coating and tells how new electrode should be used. **Circle No. 137 on Service Card.**

COMPLETE LINE OF CARBIDE ROTARY CUTTING TOOLS has been issued by the Abrasives Division, Elgin National Watch Co. Booklet explains how solid carbide end mills, rotary files and miniature cutters are used for scale and flash removal, blend and twist welds, machining in tight spots, as well as for deburring, countersinking and chamfering. **Circle No. 138 on Service Card.**

A SHORT COURSE IN ROLL PLANISHING OF WELDS is offered by Airline Welding & Engineering in a handy instruction sheet. Punched for easy insertion in shop notebooks, sheet explains how roll planishing cold works and flattens fusion welds to improve their mechanical properties. **Circle No. 139 on Reader Service Card.**

PRECISION MEASUREMENT OF PRESSURE, TENSILE OR TORQUE, IS EXPLAINED in Bulletin 11E issued by W. C. Dillon & Co., Inc. Engineering brochure contains "how-to-do-it" information on the company's force gauge and explains how tool can be adapted to dozens of different setups. **Circle No. 140 on Reader Service Card.**

CUSTOM ENGINEERED RESISTANCE WELDERS made by Thomson Electric Welder Co. featured in a colorful, illustrated 8-page brochure. Described and illustrated are a wide variety of spot, seam, press and flash butt welders. **Circle No. 141 on Reader Service Card.**

A HANDY POCKET TOOL FOR SHOP USE is introduced in literature offered by Eklind Tool & Mfg. Co. Catalog sheet describes company's Fold-Uni-Key, a single pocket tool with seven hex wrenches that fit all types of socket cap screws, set screws, stripper bolt and pipe plugs. **Circle No. 142 on Service Card.**

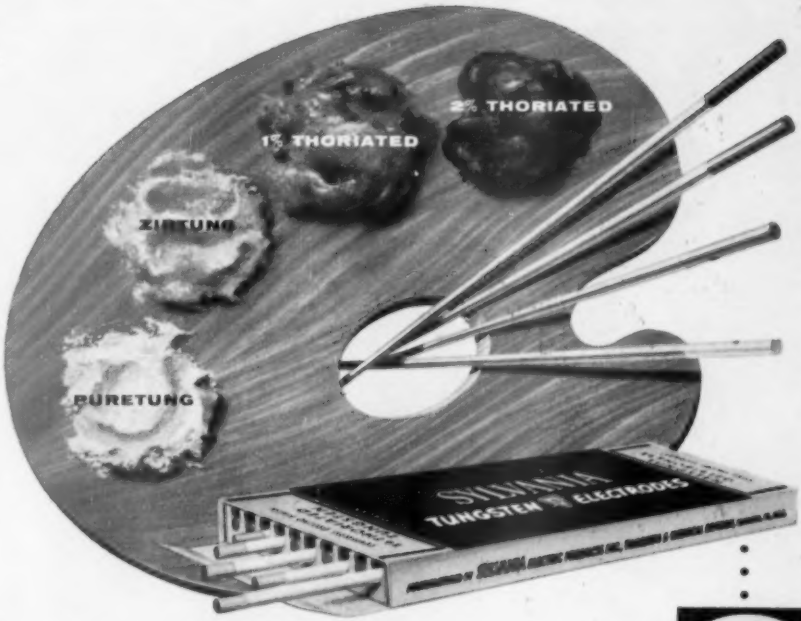
PORTABLE AIR CONTROLLED WELDER HEAD is described and illustrated by Vacuum Tube Products Co., Inc. Featured is a complete line of welders, timers and accessories for stainless steel honeycomb and aircraft applications. **Circle No. 143 on Reader Service Card.**

EVERYTHING FOR HEAD, FACE AND EYE PROTECTION is featured in complete catalog offered by Flood Safety Products Co. Described and illustrated are fiber glass helmets and face shields with fiber crown. **Circle No. 29 on Reader Service Card.**

COMPLETE RANGE OF WIRE ROPE ASSEMBLIES made by Wire Rope Division, American Chain & Cable Co., are featured in colorful and information-packed 24-page Bulletin TL 500. Included is data on construction, features, application and breaking strength. **Circle No. 144 on Reader Service Card.**

GAS REGULATORS WITH EXCLUSIVE PATENTED FEATURES are described and illustrated in catalog from Oxo Welding Equipment Co. Design details are given for regulators which are said to be guaranteed to stay in service longer with reduced maintenance costs. **Circle No. 62 on Reader Service Card.**

(Turn to Page 39)



NOW—color coded for your convenience!

SYLVANIA TUNGSTEN ELECTRODES

Now all Sylvania Tungsten Electrodes are color-coded . . . for greater safety . . . greater economy and convenience. You can tell the type of rod merely by glancing at the exposed end.

Used lengths of rods, regardless of size, no longer need to be scrapped for lack of identification. And no longer do you risk ruining a costly job because of choosing the wrong electrode.

Only Sylvania has the *complete* line—four types of electrodes, each designed for a specific job in shielded arc welding. Whether you use argon, helium, or atomic hydrogen, the four dependable electrodes will effectively meet almost any condition you may encounter.

Supplied with chemically cleaned or centerless ground finish, Sylvania Tungsten Electrodes are available in handy packages of ten color-coded rods. For further information see your welding supplies distributor or write to:

SYLVANIA ELECTRIC PRODUCTS INC.
Tungsten and Chemical Division, Towanda, Pa.

GREEN END
Puretung

BROWN END
Zirtung

YELLOW END
1% Thoriated

RED END
2% Thoriated

TUNGSTEN • MOLYBDENUM • CHEMICALS • PHOSPHORS • SEMICONDUCTORS

SYLVANIA

Lighting • Radio • Electronics • Television • Atomic Energy

Circle No. 75 on Reader Service Card.

"...if it's Miller you know it's the finest..."

Wherever industry exploits the greater profit possibilities of arc welding processes, Miller selenium rectifier type dc welders have earned re-order respect.

Adapted by design to widest range of specialized and automatic applications, the Miller SR series is offered in single or duplex models of from 200 to 1200 amperes with 60% duty cycle ratings. Lowboy units (27½" high) for stacking.

miller ELECTRIC MANUFACTURING CO., INC.
APPLETON, WISCONSIN
distributed in Canada by CANADIAN LIQUID AIR CO., LTD. Montreal

Circle No. 56 on Reader Service Card.

BENEFITS of COLD GALVANIZING are the subjects of a 4-page folder offered by American Solder & Flux Co. Folder explains how company's cold galvanizing compound rust-proofs iron and steel surfaces, prevents corrosion at welded joints and repairs damaged galvanized surfaces. **Circle No. 145 on Reader Service Card.**

A PORTABLE WELDING SCREEN that is said to offer utmost in protection is featured in catalog from Singer Glove Co. Also described and illustrated is a complete line of welding gloves and safety clothing. **Circle No. 69 on Reader Service Card.**

ALUMINIZED WIRE AND WIRE PRODUCTS are the subject of colorful 6-page flyer, Bulletin DH-537, released by Page Steel & Wire Rope Division, American Chain & Cable Co., Inc. Described and illustrated are aluminumized wire products that are said to have strength of steel and corrosion-resistance of aluminum. **Circle No. 146 on Reader Service Card.**

QUICK TRIGGER RELEASE TOGGLE PLIERS in standard and midget sizes are featured in catalog sheets and price lists from West Point Mfg. Co. How pliers can be used to hold parts for welding is explained. Complete line of pliers is covered. **Circle No. 93 on Reader Service Card.**

WORK HOLDING EQUIPMENT CATALOG contains 16 pages of information on complete line of vises, adjustable angle plates, lathe fixtures and safety work holders for drill presses. Catalog 9156 is available from Universal Vise & Tool Co. **Circle No. 147 on Service Card.**

FLEXIBLE MASK WELDING GOGGLE WITH FILTER LENS ADAPTER is introduced in literature available from American Optical Co. Described and illustrated are AO 485 goggles which have soft vinylite mask and fit tighter and closer over all prescription glasses. **Circle No. 8 on Reader Service Card.**

A WIDE RANGE OF INDUSTRIAL FANS are the subject of 20-page, illustrated brochure issued by Detroit Blower Corp. Certified performance curves and specifications are given for company's new line of aerodynamically-designed axial flow fans. **Circle No. 148 on Service Card.**

RECTIFIER WELDERS and how and why to use them is the subject of literature offered by General Electric Company. Booklet explains features including stable arc, stability of current, flexibility of control and economy of operation. **Circle No. 30 on Reader Service Card.**

NEW ROTARY FINISHER AND BUFFER is introduced in catalog sheet available from Mathewson Machine Works, Inc. Described and illustrated is unit designed for abrasive finishing, burring, sanding, buffing and polishing on metal, wood, fibre and plastic. **Circle No. 149 on Reader Service Card.**

HOW TO REBUILD WORN TRACTOR SHOES is the subject of literature available from Allied Steel and Tractor Products, Inc. Booklet explains how company's tractor grip-lugs are used to rebuild grouser shoes of track-laying or crawler-type equipment. **Circle No. 3 on Reader Service Card.**

A HANDY POCKET-SIZE CONVERSION CHART is being offered by Moeller Instrument Co. The chart makes it easy to convert between Fahrenheit and Centigrade temperatures. **Circle No. 150 on Reader Service Card.**

SIX IMPORTANT FEATURES OF TIP CLEANERS made by Thermacote Company are outlined in literature available from the company. **Circle No. 78 on Reader Service Card.**

ONE STEP REMOVAL OF RUST, PAINT, PHOSPHATE COATINGS is explained in literature from Metasurf Corp. Colorful folder explains how company's soluble-in-water R& P No. 27 alkaline stripper is used. **Circle No. 151 on Reader Service Card.**

THE BFR WHEEL is outstanding for light weld grinding, blending contours and corners, removing rust and scale, scarfing and beveling before welding. This soft-action, semi-flexible hub-type wheel has cotton fabric reinforcement with additional layer of Nylon.

THE BD WHEEL is ideal for heavier weld grinding jobs, smoothing flame-cut edges and stainless steel welds, many slotting, notching and cutting-off operations and removing light fins from castings. Glass cloth plus Nylon is the reinforcement in this rigid hub-type wheel.

Circle No. 61 on Reader Service Card.

LIGHT or HEAVY

Norton Reinforced Wheels bring the money-saving "TOUCH of GOLD" to countless weld grinding jobs

Two of the most popular Norton reinforced hub-type wheels — the semi-flexible BFR for light duty and the rigid BD for heavier work — make a team that can't be beaten for all-around usefulness. Separately, each handles a considerable number of grinding jobs. Together, they cover an almost endless list of applications, ranging from lightest scale removal to finishing heavy stainless steel welds. And they do every job with the extra safety, service life and economy that adds the profit-building "Touch of Gold" to your grinding operations.

Where regular type abrasive wheels are called for, remember that the Norton line is 100% complete, with shapes and sizes for every application. In particular, B-11 resinoid bonded wheels for your heavier jobs have the uniformity of structure and perfect balance that results in easier, faster, more profitable grinding.

See Your Norton Distributor or write the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N.Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1711

NORTON
ABRASIVES

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones Behr-cat Tapes

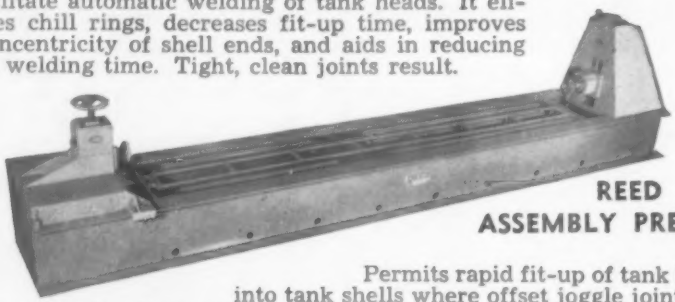
Making better products... to make your products better

Circle No. 61 on Reader Service Card.

WEBB TANK PRODUCTION MACHINERY

REED OFFSETTER

This machine forms an offset flange around shell ends to facilitate automatic welding of tank heads. It eliminates chill rings, decreases fit-up time, improves the concentricity of shell ends, and aids in reducing actual welding time. Tight, clean joints result.



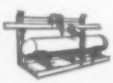
REED ASSEMBLY PRESS

Permits rapid fit-up of tank heads into tank shells where offset joggle joints are used. Hydraulic pressure is applied through ball-and-socket swivel joints that allow the head cups to set to the head. Hydraulically powered kick-outs speed up loading and unloading. Both headstock and tailstock are adjustable vertically.

Horn Type Fixtures

Cylinder Flange Offsetters

Assembly Fixtures


Unit Type Turning Rolls

Portable Turning Rolls

Automatic Welding Track Supports

FOR ILLUSTRATED LITERATURE WRITE DEPT C.

REED EQUIPMENT DIVISION
THE WEBB CORP. WEBB CITY, MO. U. S. A.

Circle No. 89 on Reader Service Card.

NEW!

AO FLEXIBLE MASK WELDING GOGGLE WITH FILTER LENS ADAPTER

Fits Over ALL Prescription Glasses

Welders will find this American Optical 486 Goggle with its soft vinylite mask remarkably comfortable. It has a smooth feeling against the face — fits tighter and closer — leaves no open gaps. Indirect ventilation louvers eliminate fogging. Rim holder is black, flame-resistant plastic, adapted to accommodate our standard lens ring and regular 50 mm. round filter lenses and cover lenses. Rings and lenses easily removed and replaced.

Here's Quality Body and Hand Protection!

AO 208BCL Cape Sleeve and Bib — Cool and provides ample protection. Chrome-tanned cowhide. Fitted sleeves with *flat* seams double cotton stitched and steel stitch reinforced. Seam ends rivet reinforced. Replaceable bib attached to cape front with heavy, durable snap fasteners across chest. Anchor buttons at armpits prevent cape from unsnapping when arms are raised. 5 sizes.

AO SCTX200 Glove — Specially tanned cowhide. Standard length. Gunn pattern. Flat seam double stitched at base of palm. Lightweight. One piece back and wing thumb give fuller palm, reduce hand fatigue. Lined on back. (Also in elkskin — two piece back.)

Always Insist on AO Trademarked Safety Products

American Optical COMPANY
SAFETY PRODUCTS DIVISION

Your Nearest AO Safety Products Representative Can Supply You!

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

Circle No. 8 on Reader Service Card.

Literature Featured In Ads This Month

TO GET ANY OF THE REFERENCE DATA DESCRIBED HERE, CIRCLE THE APPROPRIATE NUMBER ON THE READER SERVICE CARDS IN THIS ISSUE

20 **Pocket size weld gauge** for accurate calibration of butt and fillet welds described in bulletin. CHICAGO TOOL & ENGINEERING CO. Page 122.

91 **Gasaver method of cutting production costs** featured in literature. WELDIT INC. Page 3.

36 **Iron powder electrodes** for "faster burn-off" described in Bulletin R-29. HARNISCHFEGER CORP. Pages 6-7.

31 **Engine-driven welders** are featured in available brochure. GENERAL ELECTRIC COMPANY. Page 12.

59 **Cutting torch with multiple mixer in head** is described in bulletin as most efficient location. NATIONAL WELDING EQUIPMENT COMPANY. Page 15.

4 **X-ray quality welds in mild and low alloy steels** is subject of bulletin. ALLOY RODS COMPANY. Page 17.

15 **Catalog listing "all" products and processes for "all" welding and cutting** is available. BURDETT OXYGEN CO. Page 19.

85 **Portable Duplicutter** that saves material handling featured in Bulletin 353. VICTOR EQUIPMENT CO. Page 25.

26 **Arc welding accessories and cable connections** are featured in literature. ERICO PRODUCTS, INC. Page 31.

95 **How silicon rectifier means money in your pocket** is explained in literature. WESTINGHOUSE ELECTRIC CORP., ELECTRONIC TUBE DIV. Page 85.

75 **How color-coded tungsten electrodes save time . . . money,** is told in bulletin. SYLVANIA ELECTRIC PRODUCTS COMPANY. Page 37.

56 **Selenium rectifier type DC welders** are described in illustrated literature. MILLER ELECTRIC MANUFACTURING CO., INC. Page 38.

61 **Reinforced grinding wheels** that save money on weld grinding jobs are described in literature. NORTON COMPANY. Pages 40-41.

89 **Offsetter and assembly press for tank production** are described in illustrated literature. THE WEBB CORP. Page 42.

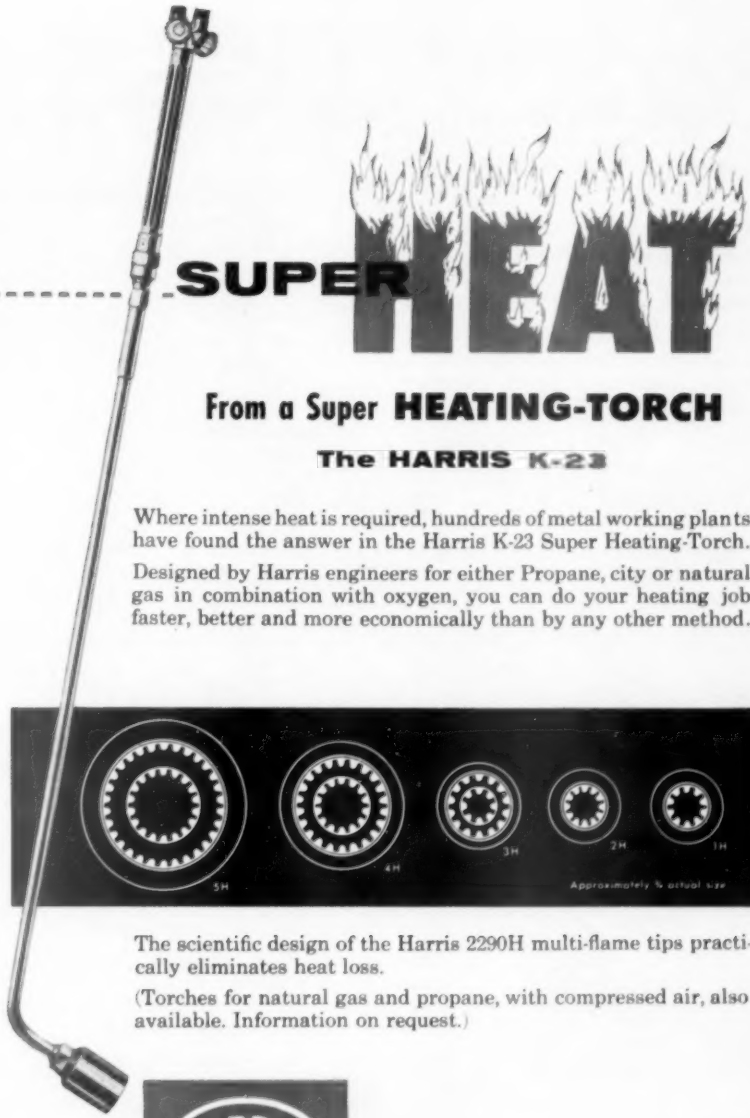
54 **Ceramic coatings and hard facing alloys** are covered in Bulletins 127 and 126 respectively. METALLIZING ENGINEERING CO., INC. Page 47.

77 **Seven reasons for using air weld flux scalers** are given in detailed bulletin. THOR POWER TOOL CO. Page 48.

71 **How CO_2 semi-automatic hand gun welding stacks up with other processes** is explained in literature. A. O. SMITH CORPORATION. Pages 68-69.

22 **Rod drying ovens that kill moisture . . . improve weld quality** are featured in free bulletin. DESPATCH OVEN CO. Page 76.

58 **Complete line of regulators, torches, and tips** are featured in



SUPER HEAT

From a Super HEATING-TORCH

The HARRIS K-23

Where intense heat is required, hundreds of metal working plants have found the answer in the Harris K-23 Super Heating-Torch.

Designed by Harris engineers for either Propane, city or natural gas in combination with oxygen, you can do your heating job faster, better and more economically than by any other method.

The scientific design of the Harris 2290H multi-flame tips practically eliminates heat loss.

(Torches for natural gas and propane, with compressed air, also available. Information on request.)

HARRIS

HARRIS CALORIFIC CO.

5501 CASS AVE. • CLEVELAND 2, OHIO

Circle No. 37 on Reader Service Card.

descriptive literature. NATIONAL CYLINDER GAS CO. Pages 78-79.

17 **Precision welding table** literature, yours for sending in coupon. THE CHALLENGE MACHINERY CO. Page 86.

7 **Automatic welder and electrodes for reguilding and hardfacing** described in available literature. AMERICAN MANGANESE STEEL DIVISION. Page 21.

66 **Resistance welding tips, holders, dies, and other needs** described fully in bulletin. S-M-S CORPORATION. Page 97.

67 **Carbide advantages** explained in folder. SHAWINIGAN PRODUCTS CORP. Page 102.

64 **Spotweld sealer** described in folder offering free sample. PARR PAINT & COLOR CO. Page 103.

74 **How Universal automatic welding head manipulator makes welding a "push-button" operation** is explained in Bulletin 6960. LEWIS WELDING & ENGINEERING CORP. Page 107.

23 **Steel or Aluminum toggle clamps** covered in literature on Models 441 and 441-A. DETROIT STAMPING CO. Page 96.

87 **Advantages of stainless steel brazing paste** explained in literature. WALL COLMONOY CORP. Page 108.

3 **Tractor Grip-Lugs for rebuilding grouser shoes** are featured in folder. ALLIED STEEL & TRACTOR PRODUCTS INC. Page 109.

46 **Economies of Hi-Amp electrode holders** explained in folder. LENCO, INC. Page 109.

cut weld cleaning time by 85%

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NEW IMPROVED HARD FACING

Tough, hard ceramic coatings provide superior bearing surfaces

Sprayed alumina forms "sapphire-hard" surfaces highly resistant to wear, abrasion and corrosion. Ideal for bearing surfaces, seals.

Development of the new METCO THERMOSPRAY GUN for spraying high-melting-point ceramic materials at low cost opens up a variety of new practical applications. One that has produced a great deal of interest is the use of sprayed alumina coatings for bearing surfaces and mechanical seals. This THERMOSPRAY 101 Ceramic Powder produces surfaces with a hardness of 9.0 on the Moh scale, (only the diamond rates 10.0) with excellent resistance to wear, abrasion and corrosion. When used in combination with special phenolic or furane plastic sealers it provides superior protection against many acids.

Another THERMOSPRAY Powder – 201 – is zirconia which is somewhat softer than No. 101 but provides superior heat-insulating properties. Melting point of this material is 4600° F. and particle hardness 8.0 on the Moh scale.

Hard-facing alloys of the self-fluxing, nickel-boron-silicon type in powder form can also be applied with the METCO Type P THERMOSPRAY GUN. These coatings may be fused, semi-fused, or left unfused depending on the hardness desired, from RC 30 to RC 65, depending on the alloy and the process used.

The new THERMOSPRAY GUN operates without compressed air, only oxygen and acetylene being required. The free-flowing THERMOSPRAY powders are fed to the flame nozzle from a hopper atop the gun, melted and propelled to the surface to be coated. These materials are sprayed many times faster (up to 15 sq. ft. per hour—.010" thick) than has been possible with equipment previously available. Deposit efficiencies are in excess of 95%. These factors result in extremely low coating costs.

Preliminary engineering data contained in Bulletin 127 covers ceramic coatings while Bulletin 126 covers the hard-facing alloys. Either or both may be obtained by filling out the coupon below or writing on your company's letterhead. No obligation, of course.

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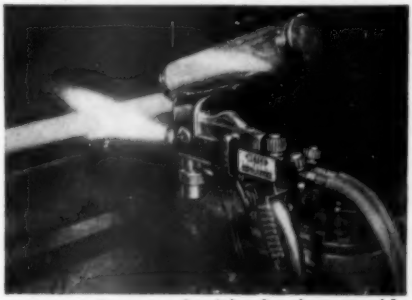

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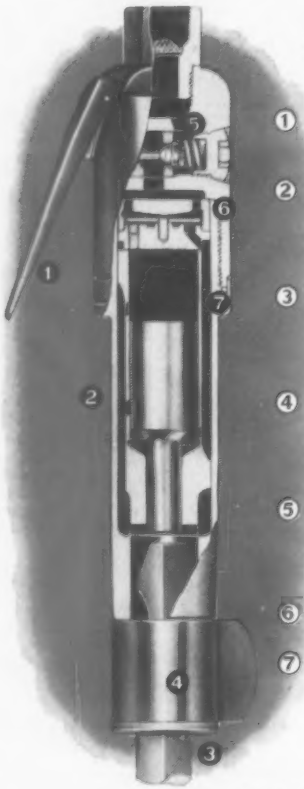

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Fabrication of high temperature alloy tubular engine parts was improved and speeded up at Ryan with a new inert arc tab welding machine.

Inert Arc Spot Welding Saves 1500 Hours

TWO new welding machines, designed and built by Ryan Aeronautical Company San Diego, California, are saving 1500 man-hours a month in little-known jobs. Called "tab-tackers," these labor-saving devices attach tiny metal tabs to parts, which are soon clipped off. In the brief interim, they perform a valuable function.

Ryan fabricates thousands of tubular parts each month which go into the production of jet, rocket and piston engines. These are combustion chambers, ducts, rings, bands, exit shells, slip joints, collars and cones. They are made from a variety of high temperature alloys including stainless steels, Inconel, titanium and cobalt-base metals.

The parts are cut from flat sheets of alloy, rolled and inert arc welded into circular form. Arc welding causes undesirable notches at the beginning and end of the longitudinal weld seam. This difficulty arises from the fact that there is insufficient metal surrounding these points to adequately dissipate welding heat. As a result, temperature rises and causes the metal in the part to melt out and form a notch.

There are two ways to overcome this objectionable phenomenon. Parts can be cut slightly oversize and trimmed after welding to remove the notches. This requires extra consumption of expensive and critical metal. Extra trimming operations and may reduce the number of parts obtainable from standard-size sheets.

The other solution is to attach small metal tabs, about an inch square, to the rolled parts, at the beginning and end of the seam to be welded. Ryan has followed this practice for many years. Using tabs avoids waste because they are taken from excess cut-off material or scrap. In some cases, the tabs can be blanked integral with the part. In other instances this is not possible because the parts are sheared or the sheet stock dimensions will not permit the extra width needed for these integral tabs.

Machine spot welds tubular seams together and at the same time attaches metal tabs which prevent melting-out of seam ends.

Notches Trapped in Tab

Arc welding is then started and finished in the tab area, rather than at the sheet edges. This places the undesirable notching effects in the tab metal which is neatly clipped off to leave the part smooth and perfect.

Before the creation of the Ryan machines, it was necessary to place the tabs and parts in small holding fixtures and arc-tack them together. Two to three minutes were needed to do each part. With Ryan's new tab-tackers, the job is done in 10 seconds.

The tab-tackers were designed by Ryan plant engineer, John Trumble, and built by mechanical maintenance men. The electro-mechanical control systems were produced in the Ryan welding laboratory by Don Heyser.

The upper electrode of the machine consists of an inert arc machine welding torch, which has been modified and adapted to automatic operation. The "gun" is mounted vertically and energized by a 200-ampere DC rectifier-type welding power source. All the operator has to do to attach a tab is to insert the part into the machine and press a foot switch.

Versatile Automatic Welder

As the part goes in, it moves a lever which releases a tab from a cartridge container and drops it into place for welding. The operator starts the procedure by depressing a two-stage foot switch. First

(Continued on Page 98)

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Why

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Cleveland Diesel Engine Div.,

General Motors Corp.,

Cleveland, Ohio,

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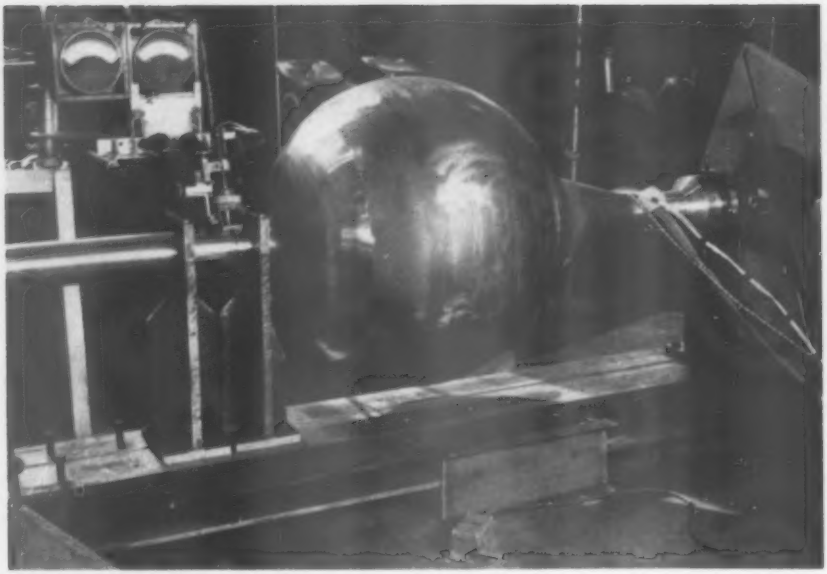
INDUSTRY & WELDING helps me to keep informed on the progress and development of the welding industry. It is a valuable reference source for technical as well as application material. For example, I recently required a specific piece of welding equipment and did not know the manufacturer's name or the name of the local sales agent. After checking several sources and drawing a complete blank, I remembered seeing the product advertised in INDUSTRY & WELDING. I could not locate the ad in the current copy of the magazine, but a phone call to the Editor of INDUSTRY & WELDING produced the information needed from his Reader Service Information File. The manufacturer was contacted and I was able to place an immediate order. Such valuable help makes me cognizant of the service this publication is making to the welding industry."

. . . . and nearly 40,000 other important welding people regularly read INDUSTRY & WELDING



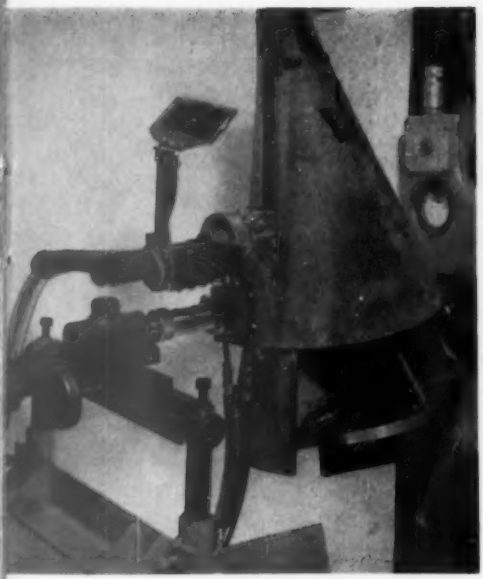
Two operators worked together during welding. One fed filler wire, maintained electrode position and operated welding current contactor; other maintained proper arc voltage, controlled welding current and operated stop and start controls. Positioner and support arrangement is shown above.

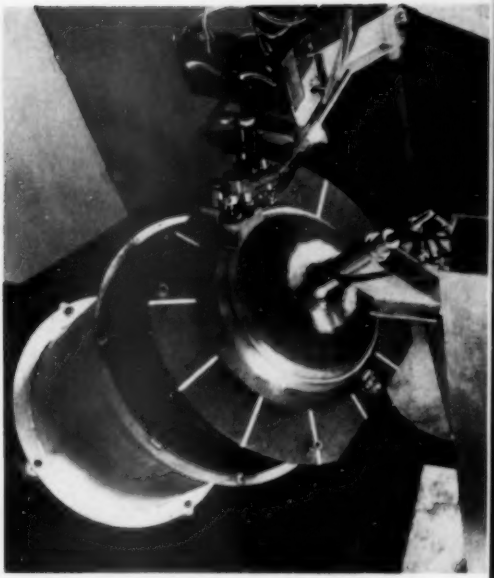
Complete Inert Gas Shield Is Key to Successful Zirconium Welding

Zirconium alloys are extremely active chemically and require complete exclusion of atmosphere by inert gas shielding to prevent contamination at welding temperatures.

FABRICATION of the first zirconium core tank ever built for a liquid fuel nuclear reactor required development of original fabrication methods and welding techniques. Designed as a spherical vessel with conical sections for entry of liquid fuel, zirconium tank is part of a 5000 kilowatt reactor recently completed for Oak Ridge National Laboratory by Newport News Shipbuilding and Dry Dock Co., Newport News, Virginia.

Zirconium was selected for the core tank because its properties meet the stringent requirements for two-region power reactor systems. These include low thermal-neutron cross section, exceptional corrosion resistance in certain en-





Typical welding set-ups include seam weld in cone section (left) and closure joint (right). Each joint was cooled between passes and any oxides removed by stainless steel wire brushing before next pass. Each pass was made along complete joint in single continuous operation.

by G. E. ELDER and E. C. MILLER
Oak Ridge National Laboratory, Oak Ridge, Tenn.
and L. F. BLEDSOE and F. V. DALY
Newport News Shipping and Drydock Co., Newport News, Va.

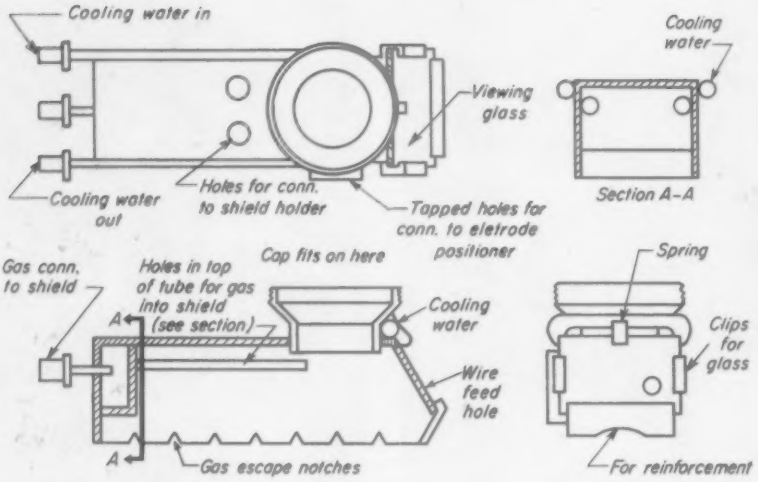
vironments and retention of adequate strength at moderately high temperatures.

Actually, an alloy of zirconium, Zircaloy-2, was specified. This is a zirconium-rich alloy containing 1.5-1.65% tin, 0.1-0.17% iron, 0.07-0.14 chromium, 0.05-0.07 nickel and a maximum of 0.009% nitrogen. Since this material had not been used previously in core vessel manufacture, a thorough investigation was made to determine if and how desired physical properties of strength and ductility could be attained in the forms required for this vessel.

Preliminary program consisted of three phases; selection of mill practices, evolution of techniques to form component parts and development of welding procedures to assemble complete vessel.

Selection of mill practices was aimed at producing structures which would lend themselves to rigors of fabrication and retain properties demanded in a core ves-

TYPICAL WELDING SHIELDS



To avoid contamination complete atmospheric blanketing of weld puddle, heat affected zone and completed weld above 1000°F with an inert gas was mandatory. This called for design and construction of individual shields (above and right) to conform with each weldment geometry.

sel. Crucible Steel Company produced satisfactory forgings and plates, employing mill practices based on procedures initially developed by Westinghouse Atomic Power Division and associated organizations.

Minimize Number of Welds

In initial planning phase, it was anticipated that problems associated with welding would be most difficult to solve. As a result, every effort was made to minimize the number of welds required. To do this, spinning appeared to be the most desirable method for forming the spherical portion of the vessel. However, anticipated difficulties eliminated this method and hot pressing was selected as the better method of achieving desired shapes within allotted time.

Basic design of the vessel with respect to number and size of various items of plate material was established prior to any attempt to form plate material. Experimental operations of forming were aimed at production of required shapes. When satisfactory plate material had been produced, actual forming of this material into desired shapes and within specified dimensional tolerances proved to be no great problem.

Achievement of the necessary accuracy in formed pieces was complicated by directional properties of the material. Therefore, a con-

siderable amount of reshaping of welded subassemblies was necessary before two such subassemblies could be machined and fitted together for further welding. Looking back, it appears that if time had permitted, spinning may have been the more satisfactory forming method.

Fabrication vs. Forging

Due to complete lack of experience in forming Zircaloy-2 plate into relatively small cylindrical shapes, and to minimize the amount of welding required for fabrication, machined forgings were employed for the inlet and outlet pipes and the outlet transition piece. In view of the experience gained, it is evident that these components could have been fabricated from plate material without undue difficulty, with a resultant saving in scrap losses, which were high with machined forgings.

Welding of the vessel was considered to be the major developmental problem and one which would be quite time consuming in its solution. Zirconium and zirconium-rich alloys are extremely active chemically and require complete exclusion of the atmosphere by inert gas shielding to prevent contamination at welding temperatures.

Zircaloy-2 had been welded previously under dry box condi-

Ground and machined surfaces were wire brushed with stainless steel to remove burrs. These areas were then cleaned with acetone to remove any traces of grease or other contaminants.

tions, but not in thicknesses which required addition of filler metal in welded joints.

Construction of a dry box or controlled atmosphere chamber of adequate size to enclose entire vessel was proposed. After consideration of all the attendant difficulties of such an arrangement, it was decided that the initial effort should be applied to development of equipment and techniques that would permit all welding to be done in the open.

Develop Shielding Techniques

The initial approach, using standard inert gas shielded tungsten arc torch fitted with a rudimentary auxiliary trailing shield, appeared so promising that major effort was devoted to the development of this type of equipment. Shielding arrangements described later were designed from information obtained from this program.

In the course of developing the shielding devices, it was necessary to establish some criterion by which the efficiency of the inert gas blanketing by these devices could be assessed.

Surface discoloration alone was found inadequate for this purpose, as some mirror bright welds were found to be quite hard and brittle, while other welds with highly discolored surfaces were as soft as the base metal and quite ductile. Time and facilities did not permit vacuum fusion analysis of all of the test welds to determine the amount and composition of the gas pickup.

Zirconium was used in core tank because of its low thermal-neutron cross section, exceptional corrosion resistance and retention of adequate strength at fairly high temperature.

Hardness of deposited weld metal and adjacent heat-affected zones was finally selected as the measure of the efficiency of shielding.

Porosity in deposited weld metal presented some difficulty in a number of test welds and in some welds made in the initial stages of fabrication. There was considerably more porosity with argon than

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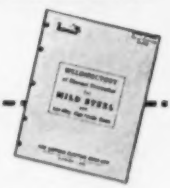

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with helium as the primary shielding gas.

Energy input and gas nozzle design were also found to be more critical factors than one would suspect. An increase in energy input and adoption of helium as the shielding gas materially reduced the porosity.

Emphasis on Inspection

All welds on the completed vessel were examined by radiography and ultrasonic methods and were sound, with a minimum of porosity.

It is probable that the consumable electrode process would accomplish sufficient improvement in welding performance and physical properties of the welded joint to merit its use, if inherent problems could be solved. These include porosity due to rapid cooling rate and production of acceptable wire of small diameter. Some exploratory work was done with this process, but time was not available to permit development required to assure integrity mandatory for a vessel of this application.

Welding throughout fabrication of the vessel was performed in the open, i.e. not in a vacuum box. In order to avoid atmospheric contamination, complete blanketing of the weld puddle, the heat affected zone and the completed weld above 1000°F with an inert gas was mandatory. This necessitated design and construction of an individual shield to conform with each weldment geometry.

Inert gas was supplied, both at the torch and behind the torch, through holes in the center copper tube of shield surrounding the torch. The external copper tubing was used for circulating water to prevent overheating of the flexible diaphragm. Small notches at the contact edge of the shield permitted flow of the gas out of the shielded area and prevented accidental inspiration of the outside atmosphere.

A hollow copper bar that conformed to the inner surface of the weldment served as a backing shield for welds on the sphere. A positive pressure of inert gas was maintained inside the bar with the gas flowing over the weld area from regularly spaced holes.

The back of the weld on the two cones and the pipes was shielded by plugging both ends of the assembly and maintaining an inert atmosphere inside the weldment.

Use Downhand Welding

All welding was done in the downhand position, except for certain of the diffuser screens. External welding shield on which welding torch and tungsten electrodes were mounted, was spring-loaded against the surface of the work. The joint being welded was moved under the shield and the torch, using either a machine carriage for translatory motion or a welding positioner for rotary motion.

A stand was provided to support the shield and torch assembly.

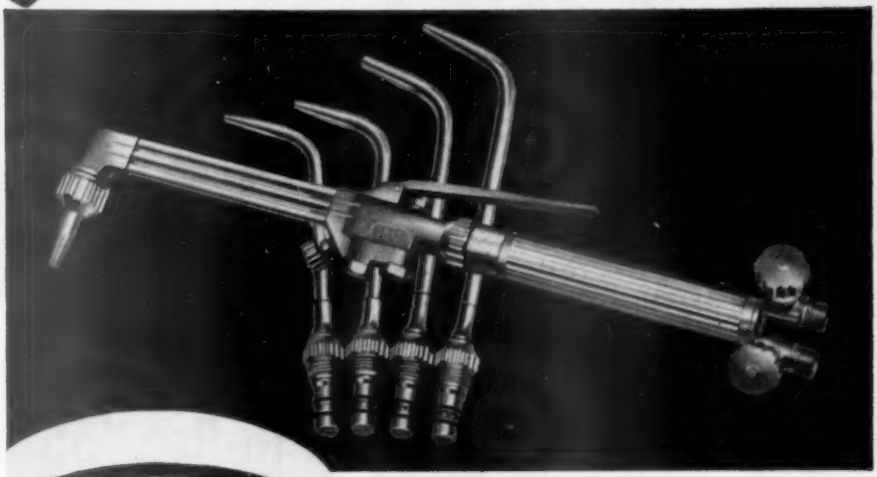
An ammeter and a voltmeter were mounted on the stand above the welding shield to give the operator close control over the welding operation.

Vertical and horizontal racks were provided on the stand to maintain proper alignment of the shield and continuous contact of the spring loaded shield.

Support arrangement was suffi-

(Continued on Page 61)

Light, handy Torch does multiple jobs... *cuts, welds, heats, brazes, solders*



SMITH'S **"PIPELINER" Welding Torch and Cutting Assembly**

...*with slip-in tips*

Developed originally for pipeline welders, this popular little guy has been drafted for all kinds of other uses. You can do welding from 1/32" to 1/4", and brazing and heating jobs. Eight other sizes of Soft-Flame tips increase welding capacity to 7/8". With the cutting assembly you can burn steel from 1/8" to 4" in thickness —clean, high speed cuts with minimum gas consumption. Insert special tips and you can do heavy scarfing, rivet washing and gouging. Tips slip in, tighten with finger twist (no wrench needed). Operators really like that handy 2 lb. weight! Over-all length 16". Your choice 90° or 75° head angle.

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SMITH WELDING EQUIPMENT CORP.

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Circle No. 72 on Reader Service Card.

Here's the real lowdown on welding cast iron with improved Ni-Rod "55"!

"You did the *improving* . . . you do the explaining!" I shout at the Boss. But he just smiles, like he doesn't know why I'm sore.

"Wrong both times, Nick!" he tells me. "*One*, it was the research boys who improved Ni-Rod* "55"* electrode. And, two, even if it does hurt your pride, somebody's got to tell these people..."

"But I've told them all along," I interrupt. "Over and over I've said Ni-Rod "55" *is just about perfect* for cast iron welding. Well, how can you *improve* an electrode like that?"

Doesn't count to ten

Now it's the Boss's turn to lose his temper . . . and he one-two's me again!

"*One*," he growls, "Ni-Rod "55" has a new crack-free flux coating. *Two*, on account of this flux, the electrode now handles even better. Also it gives even better resistance to fusion zone cracking.

"Nick, it's so simple," he shouts, "even *you* won't have any trouble explaining it!"

I see for myself

Well, *that* crack gets me thinking . . . about cracks in cast iron welds! And I decide to get the *real* lowdown on improved Ni-Rod "55".

You know how cracks develop in welds between thick and thin sections? It's due to differences in cooling rates on either side of the weld.

Well, I set up a coupla pieces of cast iron and start to weld with improved Ni-Rod "55".

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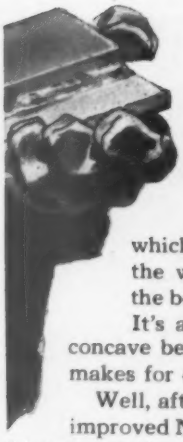


First thing I notice is that the Boss is right about the operability of the electrode. It has a *steady* spray-type arc for easy handling.

After the first pass, I wire-brush the slag, which just about slides off the weld metal. I look at the bead and I can see why. It's a smooth and slightly concave bead – which naturally makes for easy slag removal.

Well, after a second pass with improved Ni-Rod "55" electrode, I let the weld cool off. Not a sign of a crack! And that convinces me: the new flux coating sure did manage to make a great electrode *even better!*

It does almost any cast iron welding job you want...and does it well! Use Ni-Rod "55" for welding heavy sections . . . ductile iron . . . high-alloy cast irons . . . and for welding these cast irons to other metals.

Want to get some idea of the difficult jobs Ni-Rod "55" has already done? Send for "A Handy Guide to Welding Cast Irons". This folder is illustrated with *many* informative case histories.

Yours for better welds,

Nick Rodder

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N.Y.
*Reg. U. S. Pat. Off.

Circle No. 41 on Reader Service Card.

ZIRCONIUM WELDING . . .

(Continued from Page 58)

ciently rigid to eliminate vibration of the assembly while work was being moved.

Filler wire used in the vessel fabrication was swaged Zircaloy-2 wire. The preplaced, consumable insert was used in the root on all welds. Insert wire was machined from $\frac{5}{32}$ inch diameter. Wire used for the second pass was $\frac{3}{32}$ inch diameter. For all subsequent passes $\frac{1}{8}$ inch diameter wire was used. Wire was furnished with a clean surface and was cleaned with acetone prior to use.

Remove Oxide Film

Prior to fit-up, insert was tacked welded to the root nose on one of the pieces. Before tacking joint elements together, area in the vicinity of the joint preparation was ground to remove all oxide film to a distance of about one inch from the machined edge.

All ground and machined surfaces were wire brushed with stainless steel to remove burrs. These areas were then cleaned with acetone to remove any traces of grease or other contaminants.

Joint elements were tacked together without addition of any filler wire by fusing a small area of the top of the insert to each side of the joint. A torch with a number 5 gas cup and a $\frac{1}{16}$-inch tungsten electrode was used. Gas coverage was achieved with a flow of about 20 cubic feet per hour.

After each tack weld was completed, cup was held over fused area until heated portion has cooled sufficiently to prevent atmospheric contamination. Root side was protected by directing a flow of inert gas against the material on the under side of the tacked area.

(Continued on Page 87)

Precision automatic welding of stainless steel thermal bulbs is accomplished by inert arc process. Electrode holder is clamped in a swivel knuckle and work held in a special three-piece collet which fits directly into the rotating fixture.

Welding Precision Stainless Steel Parts?

HOW one company solved the ticklish problems of setting up its own stainless steel precision welding operation was told recently by the Powers Regulator Company, Skokie, Ill., manufacturer of automatic temperature controls.

Using fixtures and techniques developed by its own engineers, the company is now able to perform such feats as welding ⅛" O.D. by .018" I.D. capillary tubing without sealing the opening.

Problems of continuous seam, thin-wall welding of thermal bulbs to withstand 600 psi had to be faced when Powers decided to make these bulbs itself, instead of buying from suppliers. The decision was made for projected economy and stocking reasons.

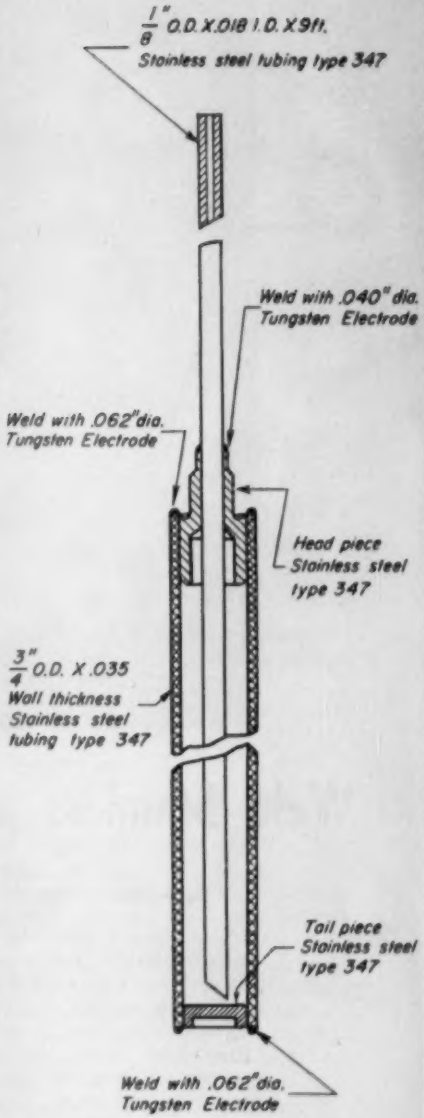
Basically, the operation consists of sealing ⅛-inch end pieces into a length of 1/32-inch wall tubing to form a closed bulb. The capillary tube is welded into a nipple on one end piece. All parts are A.I.S.I. Type 347 stainless steel.

The finished bulb is then filled with a volatile temperature-sensitive liquid which actuates, by means of pressure changes, the temperature regulating equipment which the company makes.

At least four distinct challenges had to be met:

1. Continuous seam welding of the end pieces.

Close tolerances must be met in welding capillary tube in nipple end piece. Joint must be made without closing the .018" opening in the tube.


1/8" O.D. X .018 I.D. X 9ft.
Stainless steel tubing type 347
Weld with .040" dia. Tungsten Electrode
Weld with .062" dia. Tungsten Electrode
Head piece Stainless steel type 347
3/4" O.D. X .035 Wall thickness Stainless steel tubing type 347
Tail piece Stainless steel type 347
Weld with .062" dia. Tungsten Electrode

Try Inert Arc!

2. Avoiding a possible burn through of the 1/32 wall tubing.
3. Different heat absorption rates when joining 1/32 to ⅛ steel.
4. Welding the capillary without closing the .018" inside diameter opening.

Perhaps the most formidable challenge was the fact that Powers had no knowledge of what fixtures its former supplier had used to solve these problems.

Through continuous experimentation, Erwin Saballus, chief model maker, developed the equipment necessary for the work. This consists basically of a rotating fixture with variable speed drive.

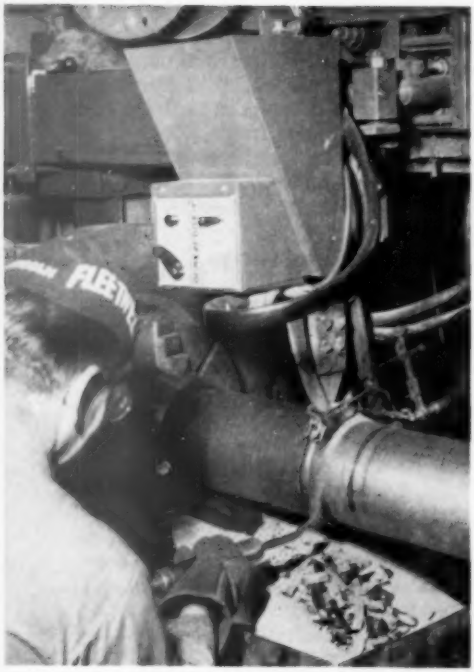
(Continued on Page 102)

Weld Stainless with Submerged Arc

by W. E. McFEE
Supervisor, Product Information Service, Armco Steel Corp.

IN all fusion welding processes molten stainless steel must be protected to prevent excessive loss of alloying elements by oxidation. Chromium is the principal element to be considered.

In gas fusion welding, this is accomplished by a blanket of combusted gases from the oxy-acetylene flame passing over the metal. Metal-arc welding relies upon coated electrodes to provide a gaseous shield for the arc stream and a slag cover for the weld bead. Inert-gas shielded arc welding employs the artificial atmosphere of argon or helium gas. Atomic-hydrogen arc welding supplies hydrogen that swiftly disposes of free oxygen.



Submerged arc overlay fused on worn stainless drive shaft. Dam holds flux.

Gooseneck nozzle allows welding of circular seams on inside of air tank.

Submerged arc welding of stainless steel boiler lining. Prefabricated sections are fitted in, then joined with longitudinal welds.

The submerged-arc method, while essentially metal-arc fusion welding, uses still another form of protection.

Instead of a coated electrode a bare stainless steel electrode wire is fed to the joint, which is covered with a mound of granulated flux. This flux may consist of fused and powdered silicate material that forms a relatively inert blanket of slag-like material or, it may consist of a combination of basic ingredients that afford both fluxing action and slag protection. The arc melts a portion of the surrounding granular substance and operates completely submerged in a molten slag. This process was once known as "submerged-melt" welding. Protection given by the cover of melt or molten slag is highly effective in the welding of stainless steels.

Both automatic and semi-automatic machines can be used. In automatic welding a motorized carriage contains all the necessary devices for heaping flux on the joint, supplying current to the electrode wire, feeding the electrode to the

Special nozzle attached to telescoping tubular adapter is used to make longitudinal welds on the inside of small diameter tanks.

Enlarged view of submerged arc set-up for making longitudinal welds in small diameter stainless steel tanks. Weld is progressing towards reader.

arc, and advancing the arc along the seam or joint. Proper arc gap is maintained by electrical controls.

In semi-automatic equipment there is a light-weight unit to feed the flux and electrode wire. It is held manually and moved along the joint to be welded. Either d-c or a-c current can be used.

Little Edge Beveling

Preparation of joints in the stainless steel sections to be welded is considerably different from other fusion arc-welding methods. Since the arc is submerged beneath a heavy layer of molten slag, an exceptionally high welding current can be applied. Amperage may be four to five times greater than for metal-arc welding with covered electrodes. This means very deep penetration into the stainless base metal with increased electrode deposition. For this reason little or no beveling is required.

Such deep penetration presents certain problems when dissimilar metals are being welded. Sometimes there are welded joints to be made where the two plates to be joined are of different grades of steel, while the electrode wire is still a third grade.

Danger of Over-Dilution

Normally, each of the three materials would contribute about one third of the metal contained in the weld bead. Therefore, if one of the base metal sections is plain carbon or low alloy steel there would be 33 percent dilution. This means there is danger that the alloy content of the weld bead will be diluted to an undesirably low level unless an electrode wire of high total alloy content is used.

An example of this is a Type 302

(Continued on Page 89)

the secret

of stable delivery pressure in a low cost regulator

The little engineering gem above gives the new GASWELD R-90 Series regulators two-stage performance—at *single-stage* regulator cost!

The "cartridge" control unit maintains absolutely constant delivery pressure from full to empty cylinder. Time-taking regulator re-adjustments are completely eliminated.

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How C-OMANUAL stac
three othe

It's a complete integrated package for gas-shielded (CO_2) semi-automatic hand gun welding

◀ C-OMANUAL package consists of featherweight hand gun, portable control console and an A. O. Smith power source.

Changing wire reels or unit inspection is extremely simple. 60-lb coils of any wire dia. are self-contained in console. Economy "pay-off packs" are available for large users through special provisions.

It's EXTREMELY EASY to set up, use and operate . . . makes changing wire sizes a breeze

With C-OMANUAL, the welder merely sets the proper current on the rectifier, pushes a start button for power. Hand gun automatically compensates for arc distance variations. Console is for fine adjustments. There's no flux to clean or slag to remove. Visible arc speeds work, lets operator see job at all times.

Whatever your means of measuring welding costs, C-OMANUAL comes out on top

A. O. Smith ran tests against a submerged-arc (semi-automatic) process and two types of stick electrodes usually used for jobs of this type. Box at right has setup information. Manual submerged-arc data was compiled from manufacturers' operation manuals.

SET-UP DETAILS ON 1/4", 100-FT FILLETS

	E-6013	E-6024	Manual Sub-Arc	C-OMANUAL
Electrode	1/4"	7/32"	5/64"	1/16" CO-86
Amps*	320	250	350	520-530
Volts	22/23	23-24	32	40/41
Polarity	a-c	a-c	Reverse (+)	Reverse (+)

*Explanation of amp variations involves theory of C-OMANUAL'S High Current Density method. Amps listed are estimates of what the processes tested would need for this job.

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acks up against her welding processes

TRAVEL SPEEDS AND METAL DEPOSIT RATES ▶

In addition to inherent speed, C-OMANUAL gives the operator visible arc. He can fully utilize high speed and fast metal deposit because he just pulls the trigger, follows the joint until weld's complete.

TIME FACTORS ▶

C-OMANUAL set-up and current settings are easy. Gun automatically compensates for arc distance to eliminate false starts, trial and error. With visible arc, there's no need to stop, see how weld's going. There's no slag to chip, flux to clean.

COST FACTORS ▶

All cost figures are based on *exact* (by weight) ¼" fillets 100 feet in length. Note: If the "overhead" or burden figures were increased, the advantage in favor of C-OMANUAL would become even more pronounced.

CHART I

	E-6013	E-6024	Manual Sub-Arc	C-OMANUAL
Travel Speed (ipm)	12.5	18.5	21.4	40.0
Deposit Rate (lbs/hr)	6.65	9.81	11.4	21.0

CHART II

Time (hrs.)	E-6013	E-6024	Manual Sub-Arc	C-OMANUAL
Arc	1.590	1.080	0.930	0.500
Electrode Change	.075	.066	.....	.....
Slag Removal	.130	.084	0.120	.....
Total	1.795 (1 hr. 40 min)	1.230 (1 hr. 15 min)	1.050 (1 hr. 3 min)	0.500 (30 min)

CHART III

Cost	E-6013	E-6024	Manual Sub-Arc	C-OMANUAL
Labor @ $2.50/hr	4.49	3.08	2.63	1.25
Overhead @ 150%	6.74	4.62	3.95	1.88
Power @ .01/kwh	.14	.08	.17	.17
Flux	.....	.....	1.43	.....
Gas (CO_2) @ .01/ft³	.....	.....	.....	.15
Electrodes or Wire	2.09	2.86	1.38	3.09
Total	$13.46	$10.64	$9.56	$6.54

RESULT — based on charts I, II and III — C-OMANUAL CUTS TOTAL WELDING COST PER 100 FEET BY 31 to 51%!

To see how C-OMANUAL can greatly improve your present set-up, cut cost, win favor with welders too—write direct for comprehensive details. Please describe, briefly, the type of work you're currently handling or planning to do. Address inquiries to A. O. Smith, WELDING PRODUCTS DIVISION, Milwaukee 1, Wisconsin.

Through research A.O. Smith *... a better way*

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CORPORATION
WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin
INTERNATIONAL DIVISION: Milwaukee 1, Wisconsin

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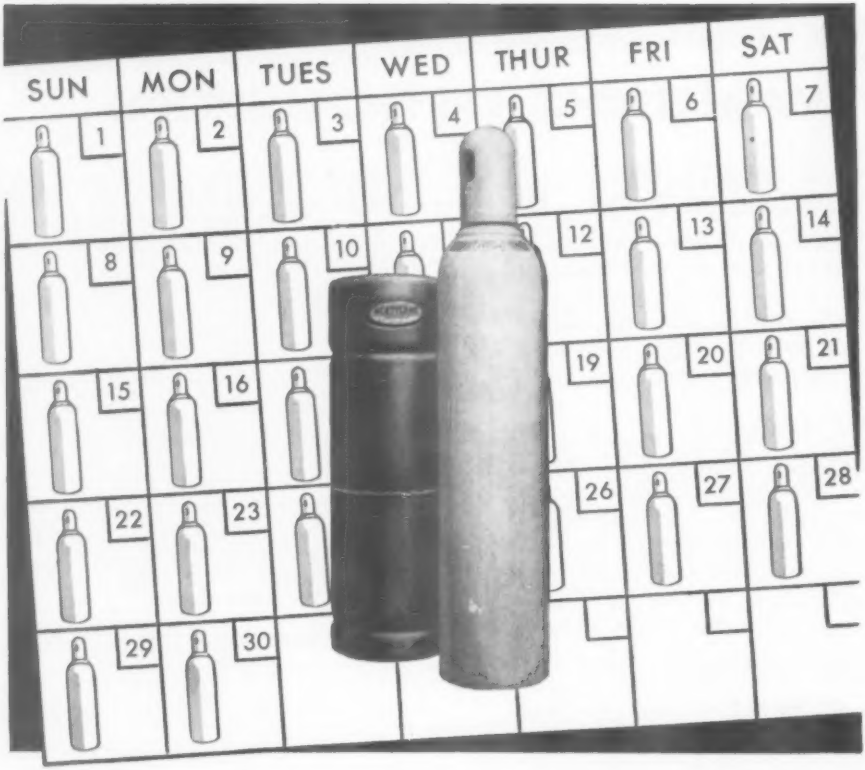

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five points to remember . . .

- √ **Use high preheat and interpass temperatures except with those alloys that would exhibit "hot short" characteristics.**
- √ **In most instances use coated electrodes, D.C. reversed polarity.**
- √ **Do welding in downhand position whenever possible.**
- √ **You can use both string beads and weave beads; however, use only string beads on those alloys that exhibit "hot short" characteristics.**
- √ **Improve mechanical properties of the weld by peening.**

. . . When You Arc Weld Copper Alloys

ALTHOUGH there is a considerable variation in the chemical composition of the various copper base alloys, most of the materials within this group can be arc welded with varying degrees of success. Coated electrodes of composition similar to the base metal may be used. However, choice of filler material may often be on the basis of either ease of manipulation or on the physical properties desired within the weld metal. This is the case with silicon-bronze or aluminum bronze-electrodes for welding the copper-zinc alloys, commercially known as the brasses. In this specific case, the choice of the two electrode types mentioned would be dependent upon the specific chemical composition of the brass to be welded and the expected service conditions.

Use Coated Electrodes

With a few exceptions, it is not advisable to use bare copper alloy rods as electrodes since the deposited metal may contain minute particles of oxide with a resultant loss of ductility within the weld joint.

Consideration must be given to adequate joint design, cleanliness of material and preheating. It is essential that tight joints be avoided in the welding of relatively light sections. Grooves of sufficient width be used to prevent excessive undercutting, slag inclusions and porosity in the welding of heavy plate materials.

Remove Oxide Film

Cleanliness of material prior to welding cannot be over-emphasized since any oxide films will interfere with the proper flow and

Electrode may be chosen for ease of manipulation or for physical properties desired . . .

wetting characteristics of the filler metal. Where a contaminant film is between two abutting surfaces, difficulty in fusing will be experienced. Washing with a hot 10 percent solution of sulfuric acid or other pickling means can be employed to remove this oxide film. Buffing or sanding may also be satisfactory provided the oxides are not rubbed into the surface. Any other contaminants may increase the formation of these oxides or cause porosity within the weld zone.

Due to the high heat conductivity of these alloys, especially those alloys that have a relatively high copper content, the heat of the arc applied at the start of the weld will soon dissipate into the plate with the result that fusion will not take place. Thus, it is usually necessary, especially in the welding of the heavier sections, that a relatively high pre-heat and, in the the event of multi-pass welding, high interpass temperatures be employed. As a general rule, the suggested pre-heat temperatures will be 150°F maximum for silicon bronze; around 400°F for aluminum bronze, phosphor bronze, etc.; between 500°F and 600°F for the brass alloys; about 700°F for beryllium copper; and, approximately 800°F for the pure copper composition.

Use Back-Up Bars

The use of back-up bars is recommended. Peening after welding not only reduces welding stresses within the joint, but also improves to some extent the mechanical properties of the weld deposit. However, care must be taken that flat nose tools be used and that the blows are not too severe. If these precautions are not observed, local failure may occur.

Due to the presence of a small amount of cuprous oxide in electrolytic tough-pitch copper, metallic arc welding of this alloy is not recommended. At the welding heat, this cuprous oxide phase will tend to segregate resulting in a severe loss of weld strength; this strength value may vary from 50 to 70 percent of the strength exhibited by the annealed base metal.

Deoxidized copper, which generally contains phosphorous as the deoxidizing agent, is preferred for applications requiring metallic arc welding; the strength of joint being comparable to that of the base metal. Multi-pass welding techniques with high interpass temperatures will permit the joining of this material in all thicknesses. The welding procedure on OFHC copper is very similar to that employed for deoxidized copper with the exception that a faster welding speed is usually essential along with a lower pre-heat so as to reduce the heat effect on the weld area. In many instances, a single pass welding is the preferred.

Use Downhand Welding

Deoxidized copper electrodes (E Cu) is usually employed where corrosion resistance, the thermal or electrical conductivity are of importance. Where it is possible to use either phosphor bronze (E Cu Sn-A) or the silicon bronze (E Cu Si) electrodes, better electrode

TABLE 1—SUGGESTED PROCEDURES FOR METALLIC ARC WELDING COPPER-SILICON ALLOYS

Metal Thickness, Inches		Number of Beads	Welding Rod Diameter, Inches	Welding Currents*	Remarks
3/16		1	1/8	125	Welding Speed 12 in. per min.
3/32		1	5/32	200	Welding Speed 12 in. per min.
1/8		1	5/32	200	Welding Speed 12 in. per min.
5/32		1	3/16	230	Welding Speed 12 in. per min.
3/16		1 2	1/4 5/32	260 200	Welding Speed 10 in. per min.
1/4	Double Vee	1 3 2 3	1/8 5/32 5/32	125 200 210	45° Bevel
1/4	Single Vee	1 3 2 3	1/8 5/32 3/16	125 200 235	45° Bevel
5/16	Double Vee	1 5 2, 3 4, 5	1/8 5/32 3/16	125 200 235	45° Bevel
5/16	Single Vee	1 4 2 3 4	1/8 5/32 5/32 3/16	125 200 210 235	30° Bevel
1/2	Double Vee	1 7 2, 3 4, 5 6, 7	1/8 5/32 3/16 1/4	125 200 235 260	45° Bevel
1/2	Single Vee	1 6 2, 3 4 5, 6	1/8 5/32 3/16 1/4	125 200 235 260	30° Bevel

* Arc short as possible—about 25 volts.

manipulation will be experienced. In addition, good metal flow of deposit will be experienced at lower preheat temperatures. Downhand welding is recommended. Precautions should be taken so tight clamping will not cause cracking of weld deposit.

In the metallic arc welding of the brass alloys, the zinc constituent offers considerable difficulty in that it will vaporize quite readily under the heat of the arc. As may be expected, this problem increases as the zinc content within the alloys increase. This zinc volitalization results in both excessive fuming and oxide formation which will prevent the formation of a satisfactory weld. However, where the strength requirements are not too high, metallic arc welding of the high brasses can be performed by utilizing either the phosphor bronze (E Cu Sn-A) or the aluminum bronze (E Cu A1-A) elec-

TABLE 2—MECHANICAL PROPERTIES OF COPPER AND COPPER-BASE ALLOY WELD METAL; SHIELDED METAL ARC WELDING

Base Metal	Ultimate Tensile Strength, psi. (Ave.)	Elongation in 2 inches, % (Ave.)
Copper (deoxidized)	30,000 to 70,000	20
Copper—zinc alloys	25,000	5 to 20
Copper—silicon alloys	40,000 to 46,000	20 to 25
Copper—tin alloys	40,000 to 50,000*	15 to 45
Copper—aluminum alloys	70,000 to 90,000	25 to 0
Copper—nickel alloys	45,000 to 50,000	25 to 30
Copper—beryllium alloys	120,000 to 136,000**	1.5**

* Hot peened. ** Heat treated.

trodes. Relative high preheats coupled with high amperage is required in order to obtain a satisfactory metal flow. The leaded brass alloys are also considered as unsatisfactory for metallic arc welding due to the tendency for the lead to "sweat out" and cause a porous and weak weld.

Limits on Preheat

The copper-silicon alloys, commercially known as the silicon-bronzes, are weldable by the metallic arc; either the silicon bronze (E Cu Si) or the aluminum bronze (E Cu A1-A) electrodes being employed. Due to the characteristic 'hot shortness' of this material, preheat is limited to 150°F. Rapid welding speeds are the preferred. Thus, it is usually recommended that a short arc is maintained and that the current values be moderate. Downhand welding is the preferred. However, both the vertical and overhead positions can also be used.

Suggested procedures in the welding of plate thicknesses from 3/32 to ½ inches are given in Table I. Joint employed is the butt type unless otherwise specified.

Due to the tendency of the phosphor or tin bronzes to become hot short and subjected to interdendritic shrinkage of the low melting point constituent, the rapid deposition of weld metal is required and precludes use of the metallic arc. As previously stated, leaded alloys within this group are not recommended for welding due to the resultant porosity of the weld deposit.

Postheat for Ductility

Either coated or bare rods, usually D.C. reversed polarity, are used; the electrode types (E Cu Sn-A) and (E Cu Sn-C) being used interchangeably. The coated rod is preferred due to the high mechanical properties of deposit that is obtained and the ease in manipulation of the electrode. Preheat and interpass temperatures between 300°F and 400°F. These facilitate deposition of smooth bead and refine, to some extent, the coarse structure that is likely to occur in multi-pass welding. This coarse grain structure

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can also be eliminated by subsequent peening. Where maximum ductility of weld deposit is required, a post-heat of about 900°F is recommended, followed by fast cooling. A short arc technique is usually employed.

Metallic arc welding of the aluminum bronzes is performed using all five electrode compositions; the essential difference between these electrodes is their aluminum content. The preheat and interpass temperatures employed vary from 400°F for the low aluminum (soft) grades, to a range from 700°F to 800°F for the higher aluminum grades (Rockwell 90B or over). The resultant deposit has good hot ductility and strength. In addition, it does not develop a coarseness of structure such as experienced with the phosphor bronzes. An anneal at 1150°F is usually required for the high aluminum alloys, followed by rapid cooling in air.

Chip Between Passes

The E Cu Ni electrode is employed in the welding of the cupronickel alloys. Since these alloys are hot short, the preheat and interpass temperatures should not exceed 150°F. Coated electrodes are essential. In addition, the importance of chipping between passes in multipass welding cannot be overemphasized.

Arc welding of the nickel silvers are not usually recommended since they behave very similarly to the brass alloys in that zinc vaporization will occur. Moderate peening will improve the mechanical properties of the weld.

In the welding of beryllium cop-

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It's an accepted fact that certain electrodes in storage tend to gather moisture and CO_2. This applies to low-hydrogen, stainless steel and non-ferrous electrodes. The amount of moisture is related not only to the percent of relative humidity, but also to the length of time that electrodes are stored. Despatch "WRD" Welding Rod Ovens provide lots of storage room in 10 spacious compartments and do a thorough, steady, dependable dehydrating job. *Specifications:* Outside dimensions—18"x19"x18". Max. Temp. 550° F; 250 lbs. rod capacity. *Write for Bulletin.*

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per, coated electrodes are essential since, as with the cupro-nickels, a refractory type oxide may form. The electrode employed has a very similar composition to the base metal, containing 2.5 percent beryllium and about 1.1 percent nickel. A pre-heat of 600°F to 700°F is required to obtain a smooth weld deposit and avoid undercutting. The deposited filler metal is erratic in behavior, and a somewhat longer arc is required to avoid freezing of the electrode. As is the case with most of the copper base alloys, downhand welding is recommended. In addition, as with the cupro-nickels, slag removal of each weld pass is required prior to deposition of subsequent weld pass.

Eutectic Appointments

Appointment of Joseph F. Quaas as Vice President in charge of Manufacturing and Production for Eutectic Welding Alloys Corp. has been announced by Rene D. Wasserman, president. Mr. Quaas has been with Eutectic since 1950.

At the same time Mr. Wasserman announced appointment of

QUAAS

LIECHTI

Charles Liechti as Chief Engineer, Technical Services. Mr. Liechti is a graduate engineer from Swiss Federal Institute in Zurich.

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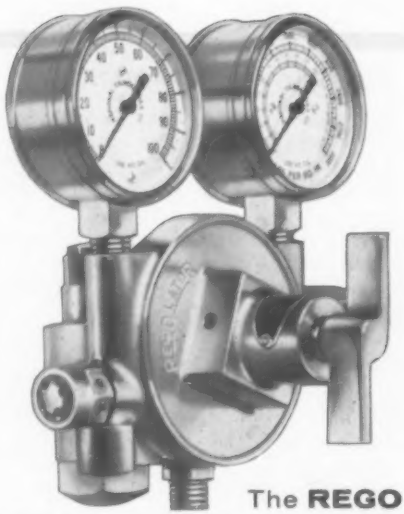

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for ALL welding . . . from lightest sheet to heaviest casting

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Fatigue factor minimized by tremendous weight-reduction. Handle and body made of lightweight yet strong aluminum alloy. So light and so perfectly balanced operators everywhere prefer the GX torch for this reason alone.

GX handles lightest sheet up to heavy castings. Operates at low pressures producing soft flames. Cylinder residuals reduced to a minimum. With KXA Cutting Attachment will cut steel up to 8" thick.

Leak-proof Joints . . . with Hand Tightening

Neoprene seating rings in the torch head permit positive, leak-proof coupling of mixer and handle with hand tightening alone. Result is longer torch life. No metal-to-metal contact. No strain on threads Seating rings absorb normal wear and abuse, prevent scratching or scoring of metal seating surfaces.

For maximum cutting efficiency with ALL fuel gases KX Cutting Torch

For toughest heavy-duty cutting of plate, multiple plate, slabs, sheets, and scrap. Ideal for use in shops, industrial plants, scrap yards, railroads—*wherever maximum cutting capacity is required.* Precision valve settings remain stable and uniform. Mixer delivers perfectly mixed gases. Perfectly proportioned and swaged tip passages provide non-turbulent preheat flames. Tip-mix type KX Cutting Tips—for cutting lightest sheet metal to heaviest sections—are available for use with any fuel gas.

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1 Made with low fuming bronze rod, oxy-acetylene flame and liquid gas fluxing equipment, completed braze weld is flame cleaned and inspected. Weld was cooled slowly, inspected and finish ground.

Braze Welding Saves 250-Ton Press

A 250-TON blanking punch press failed on the production line. It's cast iron bed, approximately four by eight feet, was cracked completely through on one side.

The repair job was assigned to Progress Products, Inc., Cleveland, Ohio, under the supervision of Michael F. Olle, president and manager.

Work was done in place on the job. It was only necessary to take off the bolster plate from the top of the bed and the cushion from beneath.

Braze welding was decided upon as the quickest and most efficient method of repairing. Arc welding with coated electrodes was ruled out because of the difficulties in

2 Fracture was chipped out in wide Vee pattern, ground smooth, backed up with carbon strips and preheated to 400°F.

3 Partially completed, braze weld was made vertical up by four operators working alternately.

4 Completed braze weld took 12 hours. Entire operation from dismantling to reassembling took only 60 hours.

penetrating the variable thickness of the fractured wall, ranging from 6-inches to 8-inches at the ends and 3½-inches thick at the center.

Fracture was first chipped out in a wide Vee pattern and rough edges ground smooth. Fracture was backed up with carbon strips and entire fractured section preheated to 400°F. Using propane gas and a large tip on the heating torch, area was periodically checked with a temperature indicating crayon until proper heat was obtained.

A bare low-fuming bronze rod, ¼-inch in diameter and 36-inches long, was selected. Asbestos blankets covered the press frame, leaving only the fractured area exposed. Oxy-acetylene equipment used was fitted with a portable liquid gas fluxing attachment which mixed flux vapor with the flame to give a protective atmosphere over the heated casting surface.

Four-Man Team

A four-man team, working alternately, began the task of braze welding. Headed by Al Piatah, welding foreman, operators started at the bottom of the fracture and slowly worked their way vertically up. Fracture was filled in a continuous 12 hour operation.

A fifth man stood by as fire watch and also looked after gas supply.

Gas fluxing contributed toward the good flowing of the filler metal and kept the brazed area clean and free from oxidation. This permitted multiple brazed passes without interruption.

Completed braze weld was then torch washed all around the entire brazed surface and inspected for

(Continued on Page 102)

Eighty-three percent reduction in preparation time on external seam weld in 5-inch thick casting is obtained with carbon arc-compressed air gouging torch. Chipping had taken 24 hours; new method requires only four. After internal welds are made, they are gouged out to 100 percent root penetration for external welds.

Gouging Castings with Carbon Arc

by TED ROBERTS
Scott-Foster Welding & Abrasives
Vancouver, B.C., Canada

IN Canada, big hydro-electric projects need out-sized equipment before they can produce. Such equipment usually takes months to build, and requires expenditure of large sums of money. Little wonder then, that companies like Vancouver Iron Works Ltd. are constantly hustling for better methods to reduce costs, speed delivery and keep competitive.

Complementing welded design already applied with effective application of the carbon arc-compressed air metal removal method, Vancouver Iron has saved many costly hours in construction of reaction-type turbines, penstock "Y"s and similar equipment.

A typical turbine, looking like a gigantic tire, weighs 90,000 lbs. complete, develops 96,000 H.P. at 240 R.P.M., and is tested at a hydrostatic pressure of 950 psi. In simple terms high quality and high strength are essential. It is fabri-

Because no preformed edge preparation is needed, sixty-five percent savings in weld preparation costs is obtained on penstock "Y" made of 15/16-inch plate (left). Both internal and external joints are veed out by gouging prior to welding. **Fifty percent reduction in cost of preparing casting defects** for welded repair (right) is also obtained.

Speeds Preparation for Welding

cated in half sections composed of individual cast segments welded together, and various welded subassemblies made of steel plate. Ultimately, half sections are bolted together to complete the circle.

Segments are prepared for welding by bevelling inside seam edges with oxy-acetylene flame. Bevels have an included angle of 75° and extend to approximately 1/3 the thickness of the 5-inch material.

After all internal welds are completed, the carbon arc-compressed air torch is employed to de-seam outside joints to obtain 100 percent root penetration. Time consumed to do each circular seam by the old chipping method was approximately 24 hours. Now, the air-assisted arc does this job in 4 hours—a fraction of the former time. Approximately 40 $\frac{5}{16}$ inch diameter carbons are required to do each seam.

Carbon consumption for the entire turbine metal removal job is between 1800 and 2000, a nominal productive expense considering large savings in time and money. Additional savings have been ob-

Only 1½ hours is required to remove 2" x 12" x 18" sections from turbine castings. Sections were cast flush for simplicity. Chipping took 14 hours.

tained because it is no longer necessary to make costly weld repairs after x-ray—common when chipping was used. This is because the torch searches out, discloses and removes all traces of defects coming into its path; chipping, on the other hand, seems to smear-over and hide defects until radiography points them out.

Prepared grooves are inspected by the magnetic particle method, as is each successive weld pass, to avoid slag entrapment or progression of cracks. Upon completion of outside welds, the whole job is furnace annealed, and all weld joints thoroughly inspected for x-ray quality.

Besides applying the torch to weld joints, it is also used to "machine" out numerous large areas cast flush for simplicity. Removing the 2" by 12" by 18" chunks by chipping, used to take approximately 14 hrs. each. The carbon arc-compressed air method has cut this time to 1½ hours with no cleanup time required.

Use Gouging on Penstocks

Vancouver also has effectively applied this type of gouging to the manufacture of a penstock "Y" for the Cheakamus Power Project. This "whopper" has a 13-ft. diameter trunk which reduces to 8-ft. 9-inches on each branch. Plate for the penstock is $\frac{1}{16}$-inch thick flange quality steel which is flame cut to

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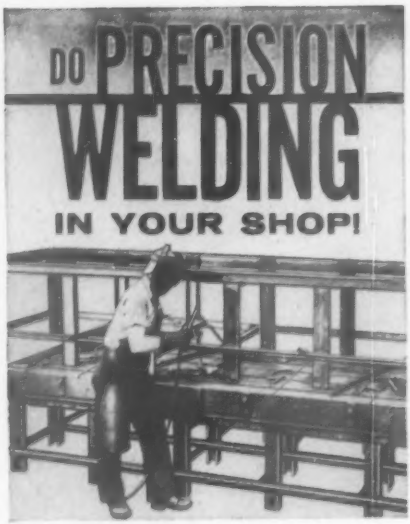

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CARBON ARC GOUGING . . .

(Continued from Page 84)

size, rolled to required diameter, butted square into position and tacked.

As in the case of the turbines, penstock seams are veed out from the inside first, to one-third the thickness of material. When internal welds are complete, outside joints are root-gouged deep enough to insure 100% penetration, then welded up. Finally, all joints are x-rayed, and the whole assembly stress-relieved.

Savings directly traceable to the carbon arc-compressed air method are approximately 65% of preparation costs formerly expended in penstock manufacture.

Other jobs have also shared in these benefits. An important one is removal of casting defects. New gouging method cut costs on this type of repair by approximately 50%.

Norton Expands In South America

Norton Company has acquired a controlling interest in Abrasivos Irmaos Meyer, S.A. of Sao Paulo, Brazil. This firm manufactures coated abrasives, grinding wheels, and abrasive grain. The announcement was made by A. Donald Kelso, vice president in charge of Norton's foreign operations and president of Norton Behr-Manning Overseas, Inc.

This will be the second Norton plant in South America. In March of this year, controlling interest in Compania de Lijas y Esmeriles of Buenos Aires was acquired. The Argentine Company manufactures coated abrasives.

ZIRCONIUM WELDING . . .

(Continued from Page 61)

Tack welds were made about every ½-inch along the joint, with pressure applied to minimize the clearance between the mating faces of the base material joint preparation and the preplaced insert.

Joint to be welded was extended by welding preformed Zircaloy-2 end tabs at the ends of each seam. End tabs were welded in an area of the assembly which was later removed by machining. Where possible, materials were sized to allow approximately $\frac{1}{16}$-inch of extra width to provide for transverse shrinkage across each joint during welding. After tacking and welding of the tabs, joints were again cleaned by brushing and by swabbing with acetone.

Jigs and fixtures used were quite complex.

Two Operators Required

Welding was done by two operators. The first manually fed filler wire into the weld puddle through the small hole in the glass window at the front of the shield. He also maintained proper transverse positioning of the electrode with the horizontal torch rack handwheel and operated the welding current contactor by means of a foot switch.

The second operator maintained the proper arc voltage with the vertical torch rack handwheel, controlled the welding current with a remote operating current control switch attached to the welding ma-

For Valuable Reference Material Available At No Charge See Page 30

the **ARC-TWIN** *Cuts Two Perfect Notches*

in *One* Downstroke of Press!

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing! Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from ½" to 2⅜" O.D.; special units, up to 3" O.D.

Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.

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Ask for twin-notched sample of pipe or tubing

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chine and operated the start and stop controls for movement of the work.

Each joint was cooled between passes and any oxide formed after passage of the shield on the preceding pass was completely removed by stainless steel wire brushing before making the next pass. Each pass was welded along the complete length of the joint in one continuous operation without pause. After weld was completed, weld reinforcement was removed by grinding and surfaces were sanded to a smooth contour.

To provide a more uniform flow of liquid fuel through the core vessel, punched and reamed ⅛-inch diffuser screen plates were welded in place in the 30 and 90 degree cones. All welds were made with a hand torch. Back shielding was used. A positive pressure of inert gas was maintained within the cone by feeding gas through an inlet in a plug which sealed the small end of the cone.

Close Check of Dimensions

After completion of the core tank fabrication, a comprehensive dimensional check was made of the exterior and thickness measurements were made using a calibrated audigage.

Two dimensional checks were made, one before and one after hydrostatic testing. The hydrostatic test was made at 775 psig maximum, with strain gage readings made at increments of 100 pounds pressure.

Core tank was then checked for leaks with a Freon detector. None were detected.

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SUBMERGED ARC . . .

(Continued from Page 66)

(18-8) stainless steel plate to be welded to a plain carbon steel plate. Here a Type 310 (25-20) stainless steel electrode wire should be used to maintain adequate alloy content.

To make a submerged-arc weld in stainless steel work, set the electrode wire in position above the joint. Either place a ball of steel wool between the electrode and work to start the arc, or use a high frequency starting device. Heap a flux mound around the electrode over the joint. Close the current contractors to start the operation.

No arc can be seen. There is no spattering and no smoke to indicate that a weld is being made beneath the mound of granulated flux as the electrode wire travels along the joint. When the end of the joint has been reached, all unmelted flux has been returned to the hopper and the solid crust of fused slag is tapped off the top of the weld bead.

It is important that the welding machine be properly adjusted to control depth of weld penetration and contour of the weld deposit. Deeper penetration is gained by (1) operating with the lowest possible closed-circuit voltage, (2) increasing the travel speed, and (3) increasing the welding current (amperage).

The author wishes to extend his thanks to Lincoln Electric Company and Linde Air Products Co., Division of Union Carbide & Carbon Corp., for the use of the photographs used to illustrate this article.

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★ *Easy Conversion for High Frequency* . . . high-frequency water and gas control may be incorporated in the welder or added later.

★ *No Oiling Required for Ten Years* . . . new sealed ball bearing, totally-enclosed capacitor motor requires no oiling for 10 years of normal operation.

★ *Wide Current Range* . . . three ranges with ample overlap prevent dead spots. A-c range from 8-400 amps . . . d-c range from 7-375 amps.

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Soldered fillet grounds aluminum electronic chassis. Small, hand-operated unit used is ideal for working with small or hard-to-handle components.

MATERIAL	2024-T3 Alclad	2024-T3 Alclad	2024-T3 Alclad	2024-T3 Alclad	2024-T3 Alclad
Gage	0.072"	0.072"	0.072"	0.072"	0.062"
Lap Width	5/8"	5/8"	5/8"	3/4"	3/4"
Solder	73Sn-23Zn-4Al	100% Sn	60Cd-40Zn	50Pb-50Sn	50Pb-50Sn
Aver. Load at Failure	2147 lbs.	2925 lbs.	2547 lbs.	1049 lbs.	1049 lbs.
Aver. Shear Strength	4580 psi	6220 psi	5440 psi	1870 psi	1870 psi

Soldered single-lap specimens in 2024-T3 aluminum were tested in a standard hydraulic testing machine with self-aligning grips. Load rates were 600 pounds per minute. Average failure loads and unit shear strength in soldered joint are shown above.

ULTRASONIC FLUXLESS SOLDERING

Soldering is an important production operation in our highly industrialized age. But, many new metals and new alloys have proved highly resistant to joining with solder. Although chemical flux used in standard soldering methods ordinarily overcomes this resistance, flux itself creates additional problems, particularly where corrosion is a critical factor.

How Ultrasonic Fluxless Soldering Works

Sound waves are produced when an impulse upon an elastic material sets up oscillating strains in the material. When a series of impulses occur regularly, a tone is created. If these impulses have a greater frequency than can be heard by the human ear, they are called ultrasonic. These vibrations can produce or affect physical and chemical reactions and can overcome the resistance to soldering of many metals.

No flux is needed because the high-frequency vibratory energy produces cavitation in the molten solder, tearing off protective films on the metal being soldered. Solder itself is melted by heat, produced either by a heating platen, a tip heater or other heating device.

When nickel is magnetized, a microscopic change in its dimensions occurs. The magnetic field is created by a high frequency alternating current supplied by an electronic generator.

As intensity of this field changes thousands of times per second, nickel laminated stack is periodically losing and regaining its length. Such a nickel stack is called a transducer because it converts the high frequency alternating current into vibratory energy.

Attached to the end of the nickel stack is a metal coupling which transmits the rapid vibrations to the molten solder.

The soldering head includes such a transducer - coupling which produces ultrasonic energy that breaks down even heavily oxidized surface film on metals. Parts to be soldered are heated to a temperature slightly above the melting point of the particular solder being used. This is done either by a heating platen, a tip heater or other equipment.

As solder is applied to heated surfaces, the tip of the ultrasonic head is brought into contact with the molten solder. Intense vibratory activity in the form of cavitation is created within solder, removing metal oxide films and permitting solder to alloy with the base metal. A soldering job takes about one to 10 seconds.

THE recently developed art of soldering and metal coating by ultrasonics — without flux — has proved to be a valuable contribution to what is often an extremely complicated operation.

Six Important Advantages

Ultrasonic fluxless soldering seems to have certain advantages over standard soldering techniques in which fluxes are used. These are:

1. Soldered joint is free of contaminants sometimes left by flux. This is important when corrosion is to be avoided and is vital in those applications requiring a tight seal.

2. Thorough washing to remove excess flux is eliminated. Production rates are higher and over-all costs lower.

3. Tooling in production operations is often simplified.

4. Metals and alloys, such as magnesium, which had been re-

These are typical ultrasonic fluxless soldering units . . . . . .

Small hand model (left) has ⅛-inch diameter soldering tip, 12 r-f watt ultrasonic generator. **Intermediate size hand unit (right)** has ⅜-inch diameter soldering tip, 70 watt tip heater, and 25 r-f watt ultrasonic generator. Both units have 600 watt heating platen and foot-operated switch.

Large hand unit has ⅝-inch tip, 100 watt tip heater, 110 r-f watt generator, 1200 watt heating platen and foot operated switch.

Tinning aluminum strip is done with 110 r-f watt generator and special transducer which has special ½ by 2-inch soldering tip.

sistant to joining with a solder now can be worked.

5. A stronger bond at soldered joint or coated surface is made in many applications.

6. Preparation of metals for soldering is eliminated.

Ultrasonic Equipment

One company which has perfected equipment for ultrasonic fluxless soldering is Aeroprojects Inc., West Chester, Penna. This company's equipment is a production tool supplied in hand models, floor models and large, industrial-type models.

Each unit consists basically of an ultrasonic generator, ultrasonic soldering head which includes transducer-coupling, soldering tip, often a tip heater and usually a heating platen.

Ultrasonic generators which drive soldering heads operate on 115 or 230-volt, 60-cycle current and range from 12 r-f watt output up to 2000 r-f watt output.

Important Soldering Head

The soldering head is the heart of ultrasonic soldering. It receives high-frequency current from the generator and converts it to acous-

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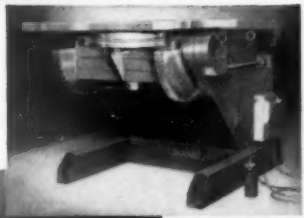

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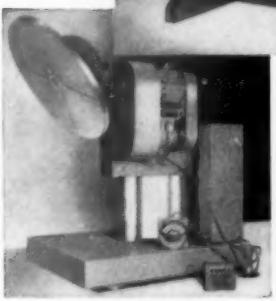

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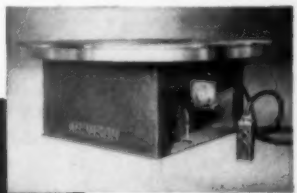

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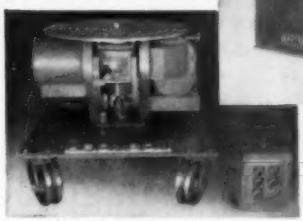

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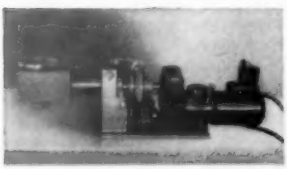

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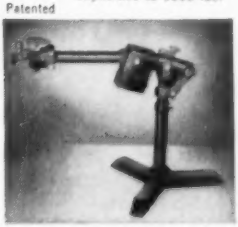

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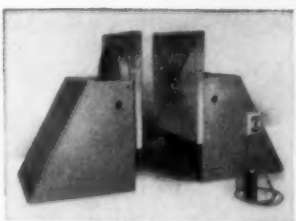

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Actually this photo shows two models—Model 441 (Steel) and Model 441-A (ALUMINUM)!—identical except 441 is of hardened alloy steel, BUT MODEL 441-A IS OF HEAT-TREATED ALLOY ALUMINUM!

What's the difference? Steel is stronger. ALUMINUM IS LIGHTER! Model 441 (Steel) weighs 10 oz; Model 441-A (ALUMINUM), only 3½ oz! 441 has holding pressure of 350 lbs.; 441-A, 200 lbs.! . . . Use steel for strength; ALUMINUM for lightness, to lessen worker fatigue, or for electronic welding, due to its non-magnetic qualities.

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tical energy. The head contains an ultrasonic transducer-coupling, a stack made of laminated nickel sheet which changes length approximately 0.001-inch with each change of intensity in its magnetic field and a rod which delivers the energy to the solder.

The magnetic field is created by high-frequency alternating current in the range of 19,000 to 60,000 cycles per second. The vibratory energy thus produced is transmitted to the soldering tip, which removes the oxide coating on the workpiece, and assists the solder in alloying with the base metal.

The transducer-coupling is cooled by either air or water, and in some instances by both.

In soldering, the workpiece is frequently held on an electrically heated flat platen of standard type. Operational temperatures of these platens extend to 800°F. Other conventional means of heating, such as gas or induction heaters, can be used where they are most satisfactory.

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This proces will solder aluminum, copper, brass, silver, magnesi-

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um, germanium, and silicon. Sound joints are said to be obtained between all types of aluminum sheet, sand and die castings, extrusions, tubing, wire and bus bars. In addition, aluminum can be bonded to silver, copper or magnesium.

The ultrasonic process will tin heavily oxidized metal surfaces with no special preparation. Anodized, Alodized or Iridized aluminum surfaces can also be tinned.

Wide Alloy Range

A wide range of solder alloys of tin-zinc and tin-lead and others are used. Many special solder alloys such as 85 tin—15 zinc or 73 tin—23 zinc—4 aluminum are utilized in particular applications.

High zinc solders, such as 95 zinc —5 aluminum-silicon and 60 zinc —40 cadmium are extremely compatible with copper. They wet readily even badly soiled surfaces.

Magnesium is tinned with a cadmium-tin zinc solder.

For Valuable Reference Material
Available At No Charge
See Page 30

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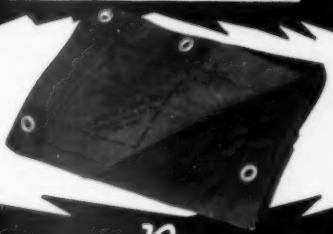
CONFINE YOUR DANGER!



USE Reeves FIRE CHIEF TREATED WELDING CURTAINS

- close woven canvas
- weighs 10 ounces per square yard before treatment
- impregnated with Hooper's Fire Chief treatment under their patent
- Underwriters Laboratory approved

The perfect protective curtain for all your dangerous work.

A. SMITH & SON, INC.
"IF IT'S MADE OF CANVAS, WE MAKE IT"
Green & Ridge Ave. Philadelphia 23, Pa.

S-M-S CORPORATION
8605 LIVERNOIS AVENUE • DETROIT 4, MICHIGAN

8 STEPS TO BETTER WELDING

ELECTRODE DRESSERS
EJECTOR TYPE HOLDERS
ADJUST-A-ANGLE ADAPTERS
ADJUST-A-PRESSURE HOLDERS
SPECIAL ELECTRODES & DIES
WELDING WHEELS & ELECTRODES
ADJUST-A-COLD ELECTRODE HOLDERS
FORGINGS & CASTINGS IN SPECIAL ALLOYS

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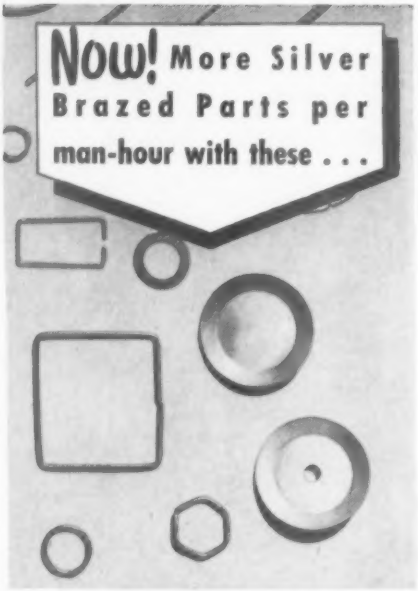

With preformed rings and washers in exact shape to fit your job, you can increase your brazing production. These shaped rings and washers are now produced by Handy & Harman in Easy-Flo and Sil-Fos — the original and time-tested silver brazing alloys.

Add to these fine products, the services of the Whitehead Technical Man whose job it is to help you with equipment and techniques, then you have a money-saving combination that's hard to beat.

For technical service, for Handy & Harman silver brazing alloys, for the best in welding materials or anything in the corrosion-resistant materials field, call your nearest WHITEHEAD Warehouse.

Meanwhile write for Bulletin HH-5

WHITEHEAD
METAL PRODUCTS COMPANY, INC.

303 West 10th Street · New York 14, N.Y.

Other Offices and Warehouses:
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Stud Welded Fastener

A new stud welded construction fastener with an aluminum which permits faster field-assembly and improves appearance of insulated metal sandwich and other curtain walls has been developed by Nelson Stud Welding Division, Gregory Industries, Inc.

Identified as Setlok fastener, and already used extensively in Fiberglas-insulated metal building, new fastening system employs a steel shoulder-type stud with serrated tip which is end welded to structural girts with the Nelson stud welding gun.

Circle No. 176 on Reader Service Card.

Credit Where It's Due

Photographs for the article by J. T. Clark, Leece-Neville Company, "Redesign for Projection Welding Yields Space Saving Rectangular Motor" which appeared on page 58 of our January issue, were made available by the Taylor-Winfield Corporation of Warren, Ohio. The editors inadvertently neglected to mention their appreciation for this cooperation—and are very glad to do so at this time.

INERT ARC SPOTWELDS . . .

(Continued from Page 50)

stage brings the upper electrode "gun" down against the tab and work, holding them firmly. The second stage automatically controls the welding sequence. Each spotweld not only attaches the tab

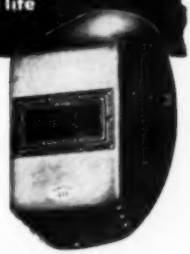
but also joins the edges of the part together. Because of this facility, Ryan often uses the machines to spot-tack parts into alignment when no tabs are to be attached.

Argon gas is turned on and allowed to flow through the gun nozzle, blanketing the tungsten electrode and work in protective gas. Next, a high frequency voltage is impressed which fires a spark between the electrode and the work. This spark ionizes the air gap and provides a pathway for the DC welding current to follow. The welding current is switched on. The welding is accomplished and the current is cut off. The argon gas flows for three seconds after the arc is broken, to protect the hot electrode and the weld from oxidation, and is shut off. Finally, the electrode pressure is timed and released.

The cycle takes only 10 seconds from start to finish. Spotwelds are uniform and sound and little adjustment is required to use the machines with widely varying thicknesses of metal.

LIGHTER, MORE COMFORTABLE

Choose Huntsman angle-shape for
- reduced glare from behind
- better top-of-head protection
- easy fit in your toolbox
- scientific upward ventilation
- longer helmet life



Angle-Shaped for Better Protection Easier Work "In Close"

Next time you need a new helmet
ASK YOUR WELDING FOREMAN TO SPECIFY
HUNTSMAN face savers
WELDING HELMETS, FACE SHIELDS & ACCESSORIES
Kedman Co., 233 So. 5th West, Salt Lake City 1, Utah

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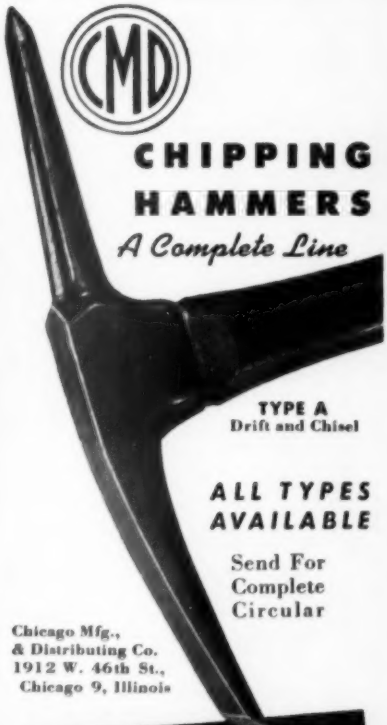
CHIPPING HAMMERS

A Complete Line



TYPE A
Drift and Chisel

ALL TYPES AVAILABLE

Send For Complete Circular

Chicago Mfg., & Distributing Co.
1912 W. 46th St.,
Chicago 9, Illinois

ORDER FROM YOUR WELDING SUPPLY DEALER

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PAGE offers a line of —the right packaging—the

In ever-increasing numbers, users of welding wire are looking to PAGE for their wire needs. The one biggest reason is that they have found that PAGE—in a unique degree—has the *facilities, experience* and *special skills* to draw and furnish exactly the right wire for your welding jobs. And behind that lies a story.

All Processes Closely Controlled

PAGE is *the one supplier* of welding wire who is in a perfect position to control the chemical and physical properties of its products all the way from billet to rod to finished wire. That is because we purchase our raw materials to rigid specifications; we select heats of carbon, low alloy and stainless steels for certain optimum characteristics—then, upon delivery to the mill, we analyze representative samples for compliance with PAGE specifications.

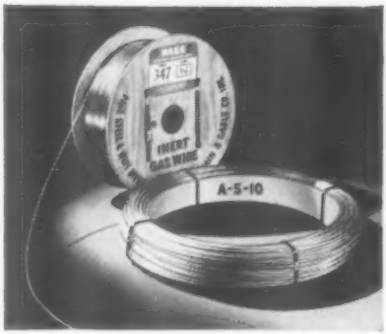
These purchasing and testing practices permit the production of wire capable of depositing weld metal which complies absolutely with welding requirements. *You don't have to compromise* when you buy, specify or use welding wire by PAGE!

Page Meets Today's Needs

One example of PAGE'S facilities for furnishing a wide range of quality-controlled welding wires for modern applications is shown by our stainless steel automatic welding wire. To meet needs of recent developments in the field of inert gas welding, PAGE offers fine wires (.020" to .09375") for use in semi-automatic arc welding machines in which the arc is shielded with argon, helium or CO_2 inert gas. These wires, wound on non-returnable plywood reels, furnish the utmost in convenience and freedom of wire feed.

Wire for All Types of Welding

You will find many advantages in standardizing on PAGE welding wire for your needs—whether for automatic or manual use . . . arc or gas welding of all types. Not only does PAGE offer a wide range of analyses, as shown in the column at the right, but we have unsurpassed facilities for manufacturing wire to any desired size, temper or surface finish—and can furnish it promptly, in many methods of packaging, through the convenient nation-wide PAGE Distributor service.



The Right Wire— Wide Analysis Range

There are *26 different analyses* in the PAGE line. These cover the field of applications: heavy automatic submerged arc...light manual submerged . . . inert gas manual . . . automatic, tungsten or metal arc.

AUTOMATIC WELDING WIRE

CARBON STEEL...Any carbon from Armco (.025 max.) to high carbon (.90-1.10)

LOW ALLOYS...All the most popular welding grades.

STAINLESS...All standard AISI grades. Other types on request.

GAS WELDING RODS

Since 1914, the standard of quality, uniformity and satisfactory performance. PAGE offers an exceptionally wide range of rods—furnished in 36-inch lengths, in coils or on reels in the following materials: Mild Steel • Armco • Low Alloy • Carbon Steel • Stainless Steel • Manganese Bronze • Naval Bronze

BARE ELECTRODES

PAGE Bare Electrodes are supplied in any carbon from Armco to high (.90-1.10) carbon.

METAL SPRAY WIRE

Furnished as follows: Any carbon from Armco to 1.00 carbon • Low Alloy • Stainless Steel • Manganese Bronze • Naval Bronze

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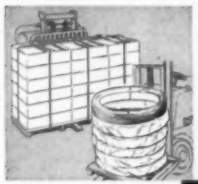
the right welding wires
right service—for modern needs

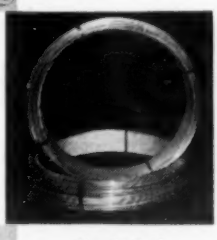
PAGE WIRES ARE PACKAGED RIGHT

PAGE Welding Wires are packaged in a wide variety of ways for the most complete protection and the utmost convenience in handling, in stocking and in use.



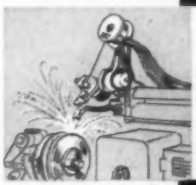
Wrapped Coils and Coils in Cartons

Single and palletized coils, each coil steel-strapped and wrapped in waterproofed paper. ...Also, coils in individual cartons, singly or palletized.



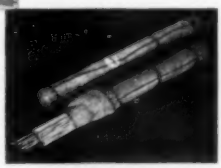
Welding Wire in Coils

PAGE A-S Automatic Welding Wire is regularly furnished in layer wound coils with cardboard liner, four Signode straps to facilitate coiling and easy unwinding.



Handy Reels

PAGE Inert Gas Welding Wire is available on reels: Precision thread-wound on twenty-five-pound, non-returnable reels to fit all popular inert gas welding machines.

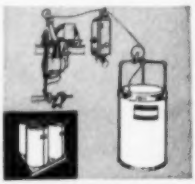


Gas Rod Packing

Gas welding rods are packed in 36" lengths in 50-lb. bundles—paper and burlap wrapped. Also in coils and reels (approx. 150 lbs.)—burlap wrapped. Stainless rods also come in 10-lb. fibreboard cartons.

LEFT: Pay-off-pak ready for filling, with "wire slinger" for uncoiling at extreme left. RIGHT: "Wire slinger" installed for feeding out wire; also, below, re-usable lid and retaining ring. Ring insures smooth feed-out of wire without snarls or kinks.

Sketch at right shows Pay-off-pak for continuous feeding up to 500 lbs. of wire without rethreading. Also (inset) lightweight Leverpaks. Both these containers protect against coil distortion... are easily opened, resealed, handled, stored.



PAGE Service Means Prompt Delivery From Local Stocks

You can get PAGE automatic arc welding wire, or oxy-acetylene welding rods quickly and easily from your nearby PAGE Distributor.

PAGE Distributors carry ample stocks from which your requirements can be filled without delay or inconvenience to you. This handy service not only saves you time in getting what you need, but makes it unnecessary for you to make a sizeable investment in inventory.

Send For These

Folder **DH-402A**—PAGE Submerged Arc and Inert Gas Welding Wire.

Booklet **DH-1277**—PAGE Gas Welding Rods.

Write our Monessen, Pa., office for *either or both*

ACCO products

ACCO

Page Steel and Wire Division
AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

Better Value

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MEETS EVERY STANDARD ACROSS THE WORLD!

The leader for over forty years.
Quality in any quantity.

SHAWINIGAN
PRODUCTS CORPORATION
EMPIRE STATE BLDG. ● NEW YORK 1, N.Y.

PRECISION PARTS . . .

(Continued from Page 63)

When welding the end pieces, the bulb is rotated at 10 r.p.m. A speed of 30 r.p.m. is used when welding the capillary.

The welding equipment consists of DC welder using .040" diam. thoriated tungsten electrode for the arc. Argon gas is used for shielding to prevent oxidation and scaling. The arc length ranges from 1/32-inch to 1/16-inch from the metal.

According to Powers, the bulbs welded by this process meet every test and specification required.

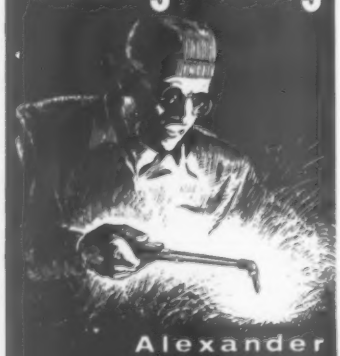
BRAZE WELDING . . .

(Continued from Page 81)

inclusions. The press form was then completely covered with asbestos and allowed to cool slowly.

When cooled, braze weld was finish ground and examined for re-cracking or other defects. None were evident so press was reas-

Heavy-Duty



WELDING AND CUTTING EQUIPMENT

DURABLE Alexander Milburn welding and cutting equipment is designed for heavy-duty applications.

COMPLETE Alexander Milburn line includes "packaged" kits, wide range of tips and torches, accessories and supplies.

GUARANTEED Alexander Milburn products provide complete protection against defects of workmanship.

RELIABLE Alexander Milburn equipment — serving the welding industry since 1907 — is your assurance of product dependability.

MILBURN Incorporated
70 OKNER PARKWAY - - - LIVINGSTON, N. J.

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sembled and put back into production use.

Entire operation from dismantling to reassmbling took only 60 hours. Life of the press was renewed and brazed welded fracture added greater tensile strength to the repaired casting. Cost was negligible since it would have taken at least six months to get a replacement which would have cost thousands of dollars.

Operators who worked on the job preferred the gas fluxing method because formation of flux pockets was eliminated and amount and removal of flux residue was minimized. They also felt that fumes were minimized and that the problem of accurate flux placement was eliminated.

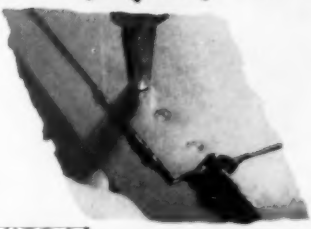
Touchdown for Structural Welding

Under the spreading arms of this new welded, rigid frame structure,

200 x 400 feet, the Ohio State Buckeyes are going to be able to practice football without regard for rain, sleet or snow. Photograph shows early stages of the welded steel frame work of an indoor practice arena for Ohio State University, nearing completion in Columbus, Ohio. Building is a steel structure with a clear span of 200-feet, consisting of 18 all-welded rigid frames.

WATER-TIGHT ... CORROSION-FREE SEAMS with

PARWELD SPOTWELD SEALER



EXTRA!

- Weld button blow-back eliminated.
- High-speed gun application.
- Low resistance that saves current and time.
- Electrodes may be used in contact with sealer without freezing or pitting.

Try a sample at our expense!

THE PARR PAINT & COLOR CO.

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MUREX

SPEEDEX-R

ELECTRODE

(iron powder similar to E-6010 type)

. . . in ANY weld position
a fast, high-quality deposit

SPEEDEX-R is an iron powder version of the popular Murex Type R electrode. An outstandingly easy rod to handle in every position, it has a stable, spray-type arc with little spatter loss. Deposit is fast to lay and easy to control, because it wets and spreads readily, freezes quickly. Slag is thin, glassy and easily removed even in confined areas. Welds have shallow-rippled, smooth surfaces when made with normal arc length and the usual welding techniques.

SPEEDEX-R electrodes offer the speed of iron powder electrodes in all positions for welds requiring high tensile strength, excellent ductility and freedom from porosity. They help to shorten production schedules and cut welding costs, and provide weldments with physical properties well above minimum requirements.

SPEEDEX-R *Applications:*

- Pipe lines, pressure pipe
- Pressure vessels (fired and unfired)
- Tanks
- Low-alloy, high tensile steels, ¼" or less
- Steel casting repairs
- Plain or galvanized surfaces
- Field construction
- Machinery parts
- Shipyard applications

Give SPEEDEX-R electrodes a try and see the results for yourself. For further information on how they may be applied to your specific problem, please write.

WELDING SUPPLIES
RADIOGRAPHIC EQUIPMENT
PLATING MATERIALS
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HEAVY MELTING SCRAP

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HOW IS STRAIGHT LINE DEPRECIATION BEST?
CAN A PROPIETORSHIP BE
ABOUT RESEARCH & DEVELOPMENT EXP.
SICKNESS OR INJURY EXP.
ARE TAXED SAME AS A CORP.
ARE REPAIRS DEDUCTIBLE AS AN EXPENSE?
MACHINERY EXPENSES
REMODELING EXPENSES?
INCOME TAX RETURN

HOW TO SAVE YOUR TAX DOLLARS

MANY businesses could reduce their tax burden if they were aware of the tax considerations affecting a variety of transactions. The most feasible means for many businesses to keep alert to tax saving opportunities is frequent consultation with a properly qualified advisor. If the firm retains an accountant or a firm of accountants, there should be tax consultations not just once a year when the filing date approaches, but throughout the year as decisions are made which will affect the tax.

Choice Of Depreciation Method

Certain tax-saving steps are still possible at tax-filing time. One of them is the proper choice of depreciation method. The first step is to determine the estimated useful life of any asset acquired during the tax year. Every businessman should have a copy of "Bulletin F," which contains tables of "average" useful lives. It is available from the Superintendent of Documents, Government Printing Office, Washington 25, D.C., for 30 cents. The tables provide a guide, but it is not necessary to follow them exactly.

The simplest method is straight-line depreciation. It may also be the best in your particular case. Just divide the cost (less what you expect to sell it or trade it in for when it is replaced) by the number of years of estimated useful life, and this is the amount to be deducted each year. In arriving at the original cost, don't forget to include freight and installation charges in addition to the price paid for the equipment.

The law now specifically permits several other methods of depreciation for new assets having a useful life of three years or more. One of them is known as the declining balance method. In the first year the depreciation rate is twice

what it would be under the straight-line method. The next year the same rate is applied to the amount remaining to be depreciated. This process is repeated each year.

The result is that a greater proportion of the cost is depreciated during the early years of the life of the asset.

Another new method, known as "sum of the years' digits," has a similar effect. You should figure depreciation on a new asset in all possible ways so that you can decide which is best for you and make the proper choice.

These methods of rapid depreciation may be particularly helpful to a company which is currently making large outlays for new equipment, but the depreciation left for the later years of the asset's life will be less than under the straight-line method. The best method depends upon the circumstances of the individual company, and is also affected by such imponderables as estimates of future earnings and tax rates during the life of the asset.

Research And Development

Another choice confronting the taxpayer is whether to treat research and development costs as immediately deductible expenses or to amortize them over a period of years. The immediate deduction is certainly a "bird in the hand" and may be very attractive to a company which needs this tax benefit to help finance the undertaking.

The company which can afford to spread the cost over the estimated useful life (or at least sixty months if the useful life cannot be determined) may find it best to do so. This is especially likely to be advantageous for companies whose income is expected to increase.

Being Taxed As A Corporation

There is a provision in the 1954 Internal Revenue Code which allows some proprietorships and partnerships to be taxed as if they were corporations. This choice should not be made lightly, as there is considerable uncertainty about the provision and the proprietorship or partnership desiring corporate tax treatment might find it better actually to incorporate.

Choice Of Fiscal Year

Regulations now permit changes of fiscal year in some cases without permission of the Treasury Department. Generally it is wise to use the fiscal year which corresponds most nearly with the annual cycle of business operations, ending at the low point of receivables, inventories and loans, instead of a calendar year. This reduces the area of possible dispute over such matters as value of inventories, and has many advantages apart from tax considerations. The change should be carefully timed, though, to avoid possible adverse tax effects during the changeover period.

Sickness And Accident Benefits

Under the present tax law, payments from your company to employees for treatment of sickness or injury are not taxed as income of the employees. If the company has a plan for continuing all or part of an employee's pay while he is absent for sickness or injury, limited amounts of this "sick pay" are also tax exempt.

This applies whether the pay-

Now... PUSHBUTTON WELDING

★ FASTER PRODUCTION

★ MACHINE TOOL ACCURACY

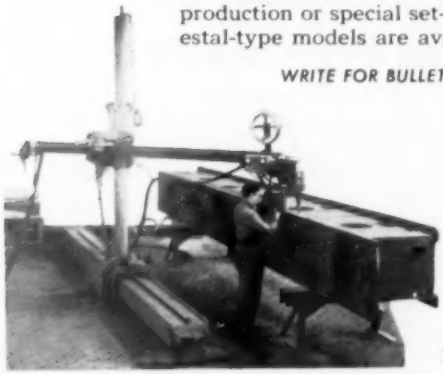
★ UNLIMITED FLEXIBILITY

7992-LWE

. . . with the LEWIS "UNIVERSAL" AUTOMATIC WELDING HEAD MANIPULATOR. Portable and fully adjustable, this new machine saves time and effort in the production of large and complex weldments. It reduces set-up times up to 60% . . . can be positioned anywhere in plant that crane facilities permit. Lightning-fast electrical controls and a portable pushbutton console permit simple fingertip operation. In addition, machine tool construction assures extreme accuracy with any standard submerged arc or inert gas-shielded arc welding head.

The LEWIS "Universal" can be used for repetitive production or special set-ups. Both track-type and pedestal-type models are available in a range of sizes.

WRITE FOR BULLETIN 6960 FOR DETAILS AND PRICES.



LEWIS

THE LEWIS WELDING & ENGINEERING CORP.

WELDING DIVISION

70 Interstate Street • Bedford, Ohio

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TIG WELDING
Made Easy With
"Visuweld" Torches

VISUWELD torches improve and simplify tig welding by giving faster and better welds with less effort and minimum torch maintenance.

- The lightest and smallest 300 amp TIG welding torch with super maneuverability.
- Only TIG torch made with standard size transparent nozzle that guarantees absolute welding visibility.
- No SPARE PARTS NECESSARY. No gaskets or parts to 'screw together'.
- VISUWELD contained unit torch head guarantees no water or gas leakeage, and the coolest TIG welding torch ever designed.

Perfect welds at welding ranges from 3 to 350 Amps eliminates the need for 'standby' torches. VISUWELD torches are 3 torches in 1.

TEC TORCH CO., Inc.
300 Paterson Avenue
Carlstadt, N. J.

ments are made by the company or by an insurance company. In the case of a sickness requiring hospitalization even for one day during the course of the illness, or in the case of *any* injury, the first $100 per week of payments are tax free. In the case of sickness which does not require as much as a day's hospitalization, the exemption begins after the first week of absence.

No great formality is required concerning the "plan" but it should be explained to employees, and appropriate records kept of the amounts paid. Proposed regulations governing tax withholding in 1956 from payments to ill employees were still under discussion when this article was prepared.

Repairs And Improvements

If you contract for repairs and improvements to your business property, be sure that these two types of work are billed separately. Should you lump them together, you may find that the entire cost has to be capitalized for future depreciation. By listing the cost of repairs as a separate item you are allowed to deduct it as an expense of the current year.

Now—Braze Stainless Steel with New Brazing Paste and Gas Torch

Every shop can braze stainless steel with new Nicrobraz Paste and standard oxy-acetylene equipment. A nickel brazing alloy combined with a new protective flux, Nicrobraz Paste doesn't require furnace brazing.

To learn more about this easy-to-apply, easy-to-fuse material, write and ask for more information.

Stainless Processing Division
WALL COLMONOY CORPORATION
19345 John R Street, Detroit 3, Michigan
Branch Offices at: Bristol Pike, Morrisville, Pennsylvania
1565 Bluff Road, Montebello, California

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For example, you might have a furnace repaired and new radiators added. By separating the charges you can deduct the cost of the repairs in the current year, although the new radiators would be improvements subject to depreciation during their useful life.

Keeping Good Records

Many deductions are lost through failure to keep adequate business records. Be sure that you have good records to show you what deductible expenses you have had, and to back up your deductions in case you are questioned by the Government. This applies particularly to your out-of-pocket business expenses, such as travel and entertainment of customers, and to items which are deductible on your personal income tax return.

Good records and properly qualified professional tax assistance—at tax-filing time and throughout the year—are the keys to income tax savings.

This article is based on information supplied by the American Institute of Accountants.

REBUILD WORN TRACTOR SHOES

With Bulldog Grip Lugs

Bulldog Tractor Grip-Lugs can rebuild the grouser shoes of track-laying or crawler-type equipment—at a fraction of the cost of new replacement parts. Equipment can be "re-lugged" without dismantling—saving hours of valuable down-time and labor.

Grip-Lugs are easily welded to the worn shoe. Made of special work-hardening steel, they become tougher and harder with use—usually outwear the original grouser.

For all track-laying and crawler-type equipment including Caterpillar D9's and Euclid TC-12's.

In 10 ft lengths and 5 different sizes and shapes.

ALLIED

Sales Representative and Distributor Inquiries Invited

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STEEL & TRACTOR PRODUCTS, INC.
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Here's Just 3 Reasons Why So Many Welders Have Switched

- **Wrap around Glass Fibre Tip** Insulation—30% **more** heat resistance than any other make!
- **Brilliant Red Tips and Trigger**—Bright Yellow Handle—all Glass Fibre, an outstanding safety feature!
- **Body completely insulated**—no bare spots!

HI-AMP®
ELECTRODE HOLDERS

are the most economical to buy and maintain too.

Just ask **any** Welding Supply Dealer **anywhere** for PROOF of the above statements.

LENCO, INC.
(Formerly Wagner Mfg. Co., Inc.)
JACKSON, MISSOURI

Weld with **HI-AMP**

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STAINLESS STEEL WELDING WIRE...

Spooled . . . layer wound to assure a smooth, even feed. Sizes: .035", .045", 1/16", 5/64" and 3/32" diameters.

Coiled . . . layer wound on rims for submerged arc welding. Sizes: 1/16", 5/64", 3/32", 1/8", 5/32", 3/16" and 1/4" diameters.

Cut Lengths . . . straightened and cut wire furnished in 36" lengths for inert arc and gas welding. Sizes: .035", .045", 1/16", 5/64", 3/32", 1/8", 5/32", 3/16" and 1/4" diameters.

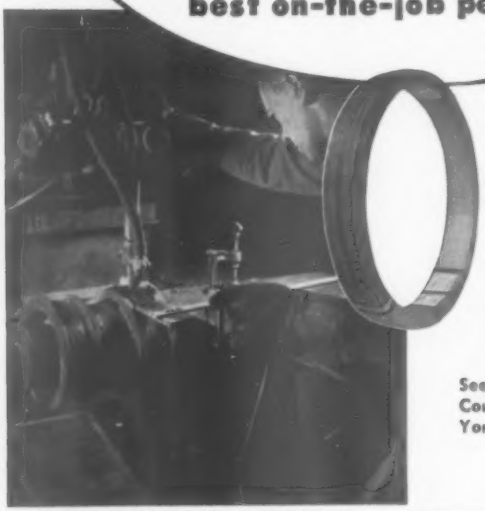
Two factors give

Drawalloy

CORPORATION

WELDING WIRE

best on-the-job performance



Drawalloy welding wire is a product of two factors—years of experience in the welding industry combined with the best wire mill drawing practices. The result is clean welding wire with the proper finish, temper, diameter tolerance and chemical analysis. It's a wire that produces the highest quality welds continuously—with an easy, sure feed and a constant, smooth arc.

See your distributor or write Drawalloy Corporation, Lincoln Highway at Alloy St., York 11, Pennsylvania

WEAR-O-MATIC HARD-FACING WIRE...

Coiled . . . precision drawn for perfect roundness to insure continuous, smooth feed with any automatic head. Available in six Types for hard-facing applications.

Drawalloy

CORPORATION

The Wire Mill For The Welding Industry

YORK 11, PENNSYLVANIA

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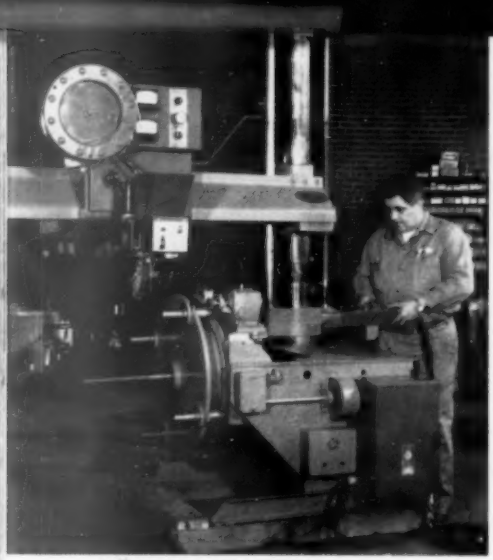

Circle No. 174 for more information.

New Type Automatic Welder Speeds Rebuilding of Tractor Rollers and Idlers

INCREASED volume of construction work and roadbuilding has created a demand for faster rebuilding of earthmoving equipment, including tractor rollers and idlers, than is possible with equipment currently available. Limited capacity of rebuilders has tied up needed earthmoving equipment and has caused downtime to soar.

Handles Four or Six Rollers

Aware of the need for faster reclamation by welding, a Cleveland, Ohio, manufacturer, has developed a high production rebuilder capable of speedily rebuilding four or six rollers or idlers. The main frame of this machine is a 2,500 lb. capacity, 135° manual tilt welding positioner. It has a turntable which is driven with an infinitely variable speed drive, and is equipped with a central spindle, suitably tooled to mount front idlers.

The outer periphery of the turntable contains either four or six independent spindles, depending on model, with proper tooling for holding rollers of a complete range of sizes. As the turntable rotates, a spindle is engaged at each 90° and is driven by a variable speed control independent of table drive unit.

A vertical column and horizontal travel beam, capable of 360° rotation around the column and 42" motorized vertical adjustment, are integral parts of the machine. The beam is designed to mount standard travel carriage and automatic welding heads. Using the movement of the carriage on the beam, a straight weld of 38" can be made to one side or behind the machine for welding grouser bars, etc.

Automatic indexing of the welding head on the beam is provided which causes the welding head to step over at the completion of each revolution. The amount of step over can be closely controlled.

All rebuilder electrical controls are incorporated in a portable push-button station, which can be located to suit the operator's convenience. Overall dimensions for the unit are: height, 96-inches; width, 56-inches; and depth, 78-inches. Approximate shipping weight is 3000 lbs.

By rotating during welding (surfacing one side of a roller and then indexing to the next), heat entry and resulting distortion are held to a minimum.

POSITIONEERING

PART 9 — POSITIONING IN GENERAL

by **CHARLES N. ARONSON, President**
Aronson Machine Company

Positioning is mechanical manipulation of a workpiece.

In Europe, a positioner is known as a manipulator. In the United States, it is common to call the machine that controls the position of a welding head, "Welding Head Manipulator." In the purest sense, anything that is moved and/or held is positioned.

In the beginning we defined Positioneering as the science of Positioning, and further limited this study to that portion of the science dealing with welding. A more specific definition of Positioning, then, would be:

Positioning is mechanical manipulation of a weldment.

Using the word "positioner" rather than "manipulator" is accepted in the United States when referring to Welding Positioners, and does seem to more closely follow the trend of thought. A weldment is in a certain position when it is being worked, and the machine that put it there and holds it there is the positioner. The operator manipulates the controls but the positioner positions the weldment and is therefore a positioner and is doing a job of positioning. The man skilled in this science is a Positioneer.

Why Position?

Unless somethng has a good reason for being, nature or good business will eliminate it. There are many good reasons why a weldment should be positioned. Each year new welding techniques and new products give rise to more and more reasons for positioning weldments. Instead of eliminating positioning, industry is continually demanding more positioning.

Accessibility is the prime reason for mechanical manipulation of weldments. If you have a box with a top and bottom needing handles welded to them, you can weld the handles on the top as it sits on the floor. Then, to get the handles welded onto the bottom, you must turn the box over so it rests on its top.

Competition Sets Pace

But then, after using the crane to flop the box over, what happens to the handles? They'll get crushed if the weight of the box rests on them. So you use saw horses. Or some other device to space the box up off the floor enough to clear the handles. And that would work fine. Except your competitor might see the advantage of using a positioner whereby he can clamp an end of the box to the faceplate and then flop the box over any time he wants to, faster and safer, and not tie up a crane to do it. Your positioner minded

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545-W Welder's Cup-type Goggles

401-7H CESCO Hat 'n' Shield

401-7F Fiber Glass Welding Helmet

410 Helmet for cramped quarters

548-W Welder's cover goggles

NEW

Ratchet-adjusting, tough plastic headgear for helmets & face shields

CESCO #438-FT Face Shield is strong, rugged, light-weight and easily tilted off the face. It is constructed of translucent fiber glass material.

New CESCO G1-R Headgear for welding helmets and face shields. Adjusts to any head size with a few quick turns of the ratchet.

• The new CESCO G1-R Headgear permits quick, easy and comfortable fitting. It adjusts to the required head size by a mere turn or two of the adjusting ratchet.

The new headgear is constructed of exceptionally long-wearing high-impact vinyl compound. It is impervious to perspiration or chemical action and is easily cleaned.

This headgear is now available on all CESCO welding helmets and face shields. It is illustrated here with the new CESCO #438-FT Face Shield.

CHICAGO EYE SHIELD CO., 2334 Warren Blvd. Chicago 12, Ill.

OFFICES IN: Atlanta, Baton Rouge, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Houston, Kansas City, Knoxville, Little Rock, Los Angeles, Louisville, Mexico City, D.F., Milwaukee, Montreal, Orange, Peoria, Philadelphia, Pittsburgh, Salt Lake City, San Mateo, Spokane, St. Louis, St. Paul, Toledo, Tulsa

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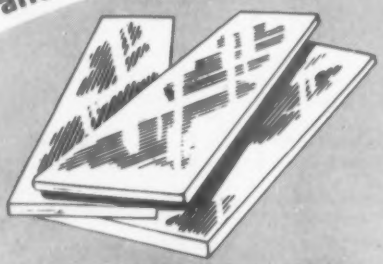
competitor can then make the same product faster and at lower cost; can sell for less than you can, and you'll have a hard time getting buyers.

Another simple example is a tank that needs a band of weld around its circumference, to hold two rolled plate sections which make it into a tank. Or just welding the heads into the ends of the tank. Welding the topmost foot or so is easy to do with the tank sitting on the floor. And when the next few feet need welding, just roll the tank along the floor a bit until another foot is accessible. But that competitor comes along with a set of turning rolls which rotate his tanks faster, precisely, safely, so, again, he runs you out of business.

There are many examples that could be given. In fact, there is hardly a single weldment that isn't made quicker and better and safer by being properly positioned.

Weld improvement is the main reason for positioning. Accessibility is taken for granted. Fundamentally, the main improvement looked for is increased speed which

unequaled
resistance to impact
and abrasive wear . . .



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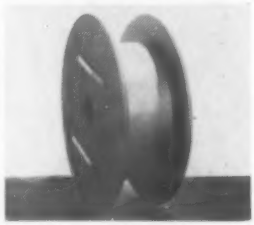

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PRESDWOOD and HARDBOARD
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in turn increases production rate and lowers production costs. In a sense, the quality of the weld has to be satisfactory, so it is more or less taken for granted, too. In other words, unless the weld is good, it is not a weld, so it wouldn't matter how fast it was made.

To be a good weld in a specific weldment might mean that there had to be a certain amount of penetration and build-up. In order to obtain the necessary amount of penetration, the weldment might have to be positioned so a certain kind of rod could be used, or so more current could be used with same rod. To get more build-up or less build-up, again it might be necessary simply to properly position the weldment.

Next month the author explains how positioning can increase the speed of arc welding.

Uihlein Heads RWMA

At its recent December Meeting, the members of the Resistance Welder Manufacturers' Association elected David V. Uihlein, president of Banner Welder, Inc., Milwaukee, Wisconsin, as President of the Association.

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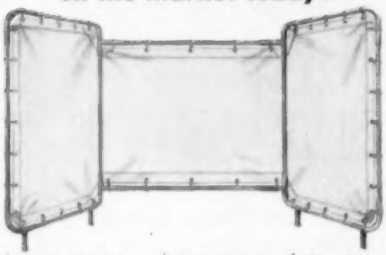
SINGER SCREEN

The only screen of its kind on the market today!



★ Light Weight ★ Rust-proof ★ Sturdy
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AT LAST—a portable screen that is a fraction of the weight of the old type. Will stand plenty of rough handling. Available in every wanted size.

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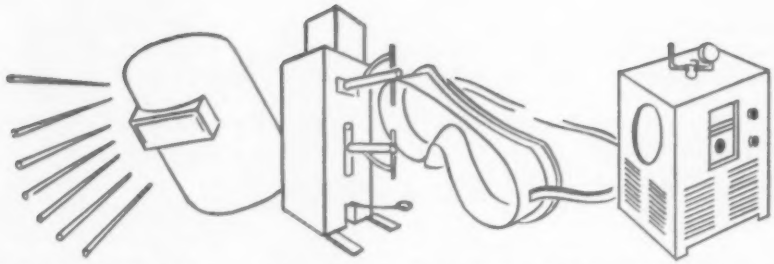


NEW PRODUCTS

Single Eye-Piece Safety Goggle

Known as "Solo Goggle" a new eye protection, designed to give "picture window" vision and maximum safety and comfort to worker, is produced by The Fibre-Metal Products Company. The new goggle with easily replaceable lenses

is made to fit closely and comfortably over the largest type safety or personal prescription glasses. "Solo Goggle" is also available with elastic headband, with head rest, and can be fitted to safety caps.

Circle No. 28 on Reader Service Card.

Standard Inert Gas Welder Used to Cut Non-Ferrous Plate

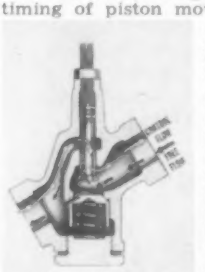
By making simple adjustments in gas flow and steel wire speed, standard Aircomatic equipment developed by Air Reduction Sales Company, can now be used for cutting non-ferrous metals in addition to welding ferrous and non-ferrous metals. Aluminum, stainless and chrome steels, nickel, Monel, Incoinel, copper, brass and aluminum bronze have been cut at high travel speeds, satisfactory for subsequent welding operations. Magnesium and titanium have also been cut using this method.

Circle No. 160 on Reader Service Card.

FOR ADDITIONAL INFORMATION
Use Reader Service Card for additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage required.

Speed Control Valve

A new valve designed for split-second timing of piston movement by positive control of air flow is announced by Ross Operating Valve Co. Offered in screw driver slot, knob or pin lever speed control adjustments, the new valve can be mounted in any position at either or both ends of piston, and can be disassembled without breaking line connection. Poppet is only moving part.

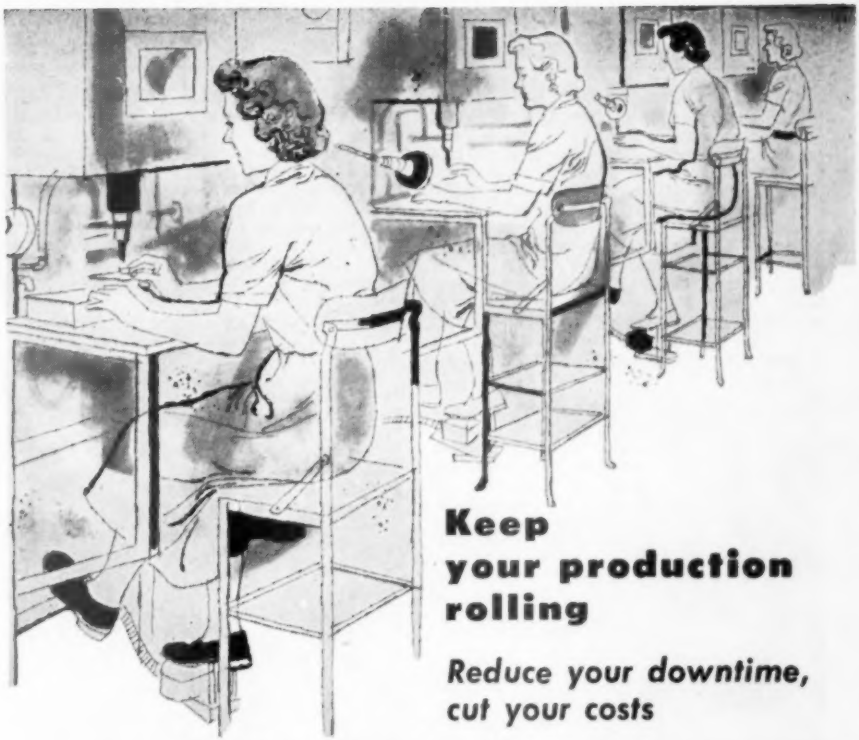


Circle No. 161 on Reader Service Card.

Machinable Cast Iron Welds

A new electrode recommended for welding high phosphorus irons, for work requiring higher strength in the weld area and for welding heavy sections—without preheat, has been announced by All-State Welding Alloys Co. The new rod, designated No. 8-60 and available in 3/32" through 3/16" diams., is said to produce higher strength, better elongation than 99% nickel rods.

Circle No. 162 on Reader Service Card.



Keep your production rolling

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. . . with AMPCO-WELD* *resistance-welding products*

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AMPCO-WELD holders — delivery from stock of straight, offset, or universal ejector types. Offset and universal holders have interchangeable sockets for No. 1 and 2 tapers.

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Circle No. 9 on Reader Service Card.

Stainless Welding Electrodes

The development of two new series of coated electrodes, said to produce high quality welds with ease of operation, has been announced by Arcos Corporation. Aerocor is designed for welding light gage stainless steel and is available in Types 308, 309, 310, 316, 347 and 349. Fabricor is intended for welding stainless steel plate and is available in all above types except 349. In operation, both electrodes are said to perform smoothly with little or no spatter, and produce high quality deposits.

Circle No. 10 on Reader Service Card.

Oxy-Acetylene Hose Reel

A new hose reel designed to safeguard oxy-acetylene hose and prevent danger from fire, sparks, oil and grease, is now available from Hardie Engineering Co. The Model A-8 hose reel weighs only 17¼ lbs. without hose but is sturdy enough to hold 150' of ¼" twin oxy-acetylene hose for many cycles of operation without leakage or undue wear. Can be permanently mounted or mounted on cylinder truck with adapter and a piece of 1" pipe.

Circle No. 165 on Reader Service Card.

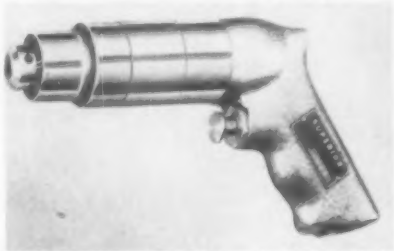
Long Life Welder Valves

Addition of stellite-faced, rotating valves as standard equipment on all its air-cooled, engine-driven welders has been announced by The Lincoln Electric Co. New type valves are expected to triple valve life, resulting in higher efficiency output from the welding generator. The cobalt, chromium, tungsten alloy holds hardness and strength at high temperatures and valve rotation insures even wear.

Circle No. 166 on Reader Service Card.

Air Drill with Metered R.P.M.

An industrial air drill featuring a metering trigger which gives positive speed control from 0 to 2500 R.P.M. has been announced by Superior Pneumatic & Mfg., Inc. Weighing only 2 lbs., the S-P 1000 is simply designed for ¼" drill capacity, low maintenance and low operator fatigue operation.



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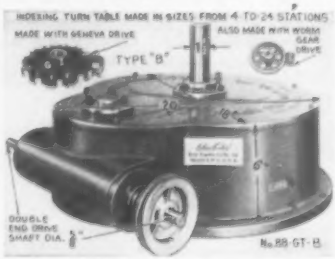
EISLER INDEXING TURNTABLES


INDEXING TURN TABLE MADE IN SIZES FROM 4 TO 24 STATIONS
MADE WITH GENEVA DRIVE
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TYPE "B"
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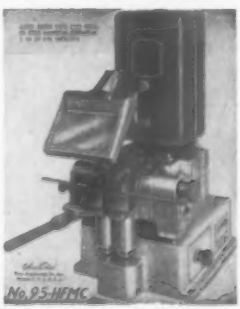
CAMS

BUTT WELDERS



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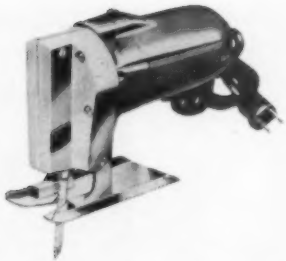

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Joint area is hand-fluxed with HANDY FLUX after which ½" piece of 1/16" EASY-FLO 45 wire is placed on top of joint area. Alloy cost is one half cent per joint.

Assemblies are placed between resistance-heating electrodes which serve also as a jig. Operator applies current with foot pedal. Melted EASY-FLO 45 penetrates joint area quickly and easily. Assemblies are then given rapid quench to preserve hardness of cross-slide and to remove HANDY FLUX easily. Time required for complete cycle: 22 seconds. This lady brazes from 1200 to 1500 assemblies per day.

GET THE FACTS OF EASY-FLO

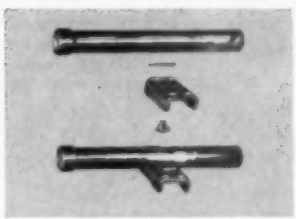
BULLETIN 20 tells you why high strength, speed and economy are inherent in EASY-FLO brazing. Also gives Handy information about joint design and fast brazing methods. We'll be pleased to send you a copy.

EASY-FLO 45 Solves Problems of Strain and Abuse

In this case, the strain and abuse are centered on the cross-slide joint of a bayonet power saw drive shaft. Made by Wen Products, Inc., Chicago, Illinois, for the do-it-yourselfer as well as the professional, this powerful tool operates at 2650 load strokes per minute and is expected to stand up to considerable strain and abuse throughout its lifetime.

The problem to be permanently solved was that of joining the steel cross-slide piece (.005 case hardened) to the drive shaft. The solution . . . silver brazing with EASY-FLO 45. A simple silver brazed joint assures all the strength this part will ever need. And the people at Wen Products were sure of it when they tested the part in this manner: After brazing, it was placed in a vise and the cross-slide piece was struck at right angles with a hammer. It was completely mangled before it was torn from the shaft. Thousands of these saws are in use today and there is no record of this joint *ever having failed* in service. That says a lot for silver alloy brazing . . . with EASY-FLO 45.

One of the beauties of silver alloy brazing is that it can join a wide variety of metals with the same excellent results and at remarkably low cost. Whatever you are making of metal, whether joints are involved *or not*, it will pay you to investigate EASY-FLO brazing. We will be glad to explain the benefits of simplified design made possible by modern silver brazing techniques —and how these advantages can be profitably applied to your production requirements. Just call us.



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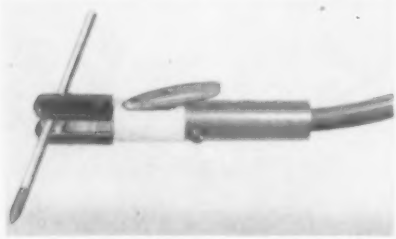
Cutting and Gouging Torch

A completely redesigned carbon arc-compressed air torch has been announced by Arcair Company. The Arcair Model H-3 torch features shorter,



more compact construction, good in hard-to-get-at places, long-life heat and impact resistant molded plastic insulators, new insulated self-holding push-button air valve, full insulation throughout and handle cable connection which removes flexure from joint. Basic features of previous models have also been retained.

Circle No. 169 on Reader Service Card.

LP Gas Salamanders

A complete line of heavy-duty LP gas salamanders has been introduced by Wemco Products. According to the manufacturer, units have low pressure triple burners, 10-inch cast iron deflectors and 100 percent safety shut-off control. They are said to give clean heat without smoke or soot and yield highest heat output with lowest BTU input. Model SLP is shown.

Also available are Models SVP with high pressure twin burner and Model SLG for liquid gas.

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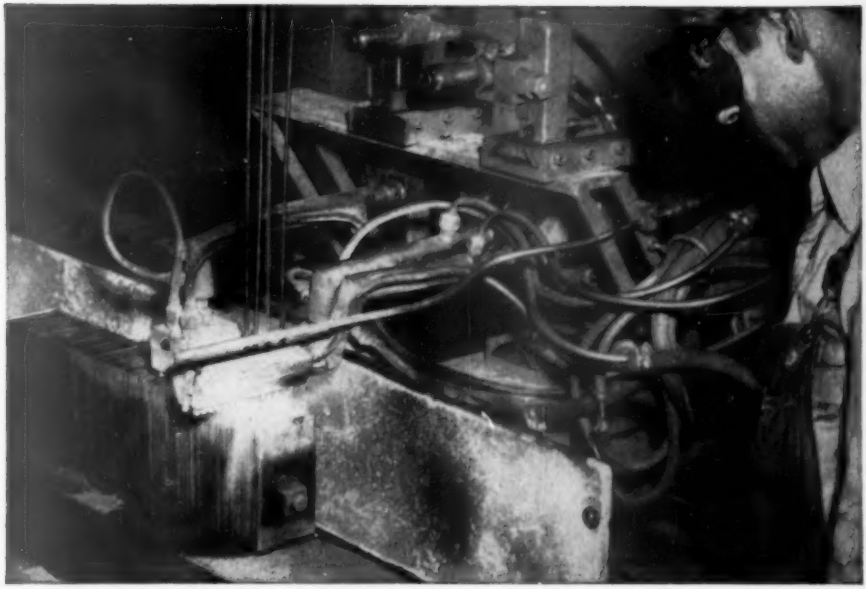


Hammers Given "4" Lives by Hard-Facing

Hard-facing with HAYSTELLITE tube rod has increased the life of hammers used in a heavy duty grinder to four times. The hammers rotate at from 3000 to 3600 revolutions per minute while pulverizing metal turnings, limestone, glass, mica, and other severe abrasives.

The protective coating formed by depositing HAYSTELLITE tube rod consists of tungsten carbide particles evenly distributed in a matrix of tough steel. This combination of tungsten carbide and steel offers the ultimate in abrasion-resistance plus impact strength.

There are 18 HAYNES hard-facing alloys . . . a wide selection that guarantees you the right rod at the right price for every wear problem. Ask your local HAYNES STELLITE dealer for literature describing these rods. If you don't know the location of your local dealer, write to Haynes Stellite Company, a Division of Union Carbide and Carbon Corporation, Kokomo, Indiana.

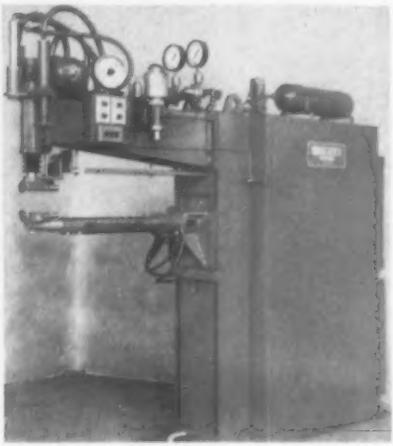
See... or *Write...* | **Your local Haynes Stellite Dealer** | **to Haynes Stellite Company**

The terms "Haynes," "Haynes Stellite," and "Haystellite" are registered trade-marks of Union Carbide and Carbon Corporation.

Circle No. 39 on Reader Service Card.

Light Gauge Spot & Seam Welder

A resistance welder which doubles as a spot and seam welder has been announced by Sciaky Bros., Inc. The new machine is an air operated press model



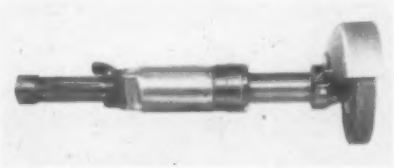
which was designed for spot and seam welding of light gauge metals such as light alloys, stainless steels, titanium, 4130 and clean mild steel. Welding capacity, depending on material being welded, is .002" to .016". Machine is designed for single phase operation and has automatic sequencing.

Circle No. 172 on Reader Service Card.

USE THE READER SERVICE CARD FOR VALUABLE REFERENCE DATA

Lightweight Air Grinder

Thor Power Tool Company has announced a new 6" grinder, said to be 50% more powerful than previous models. The 4G series of air grinders has fewer parts, and a five blade type motor with



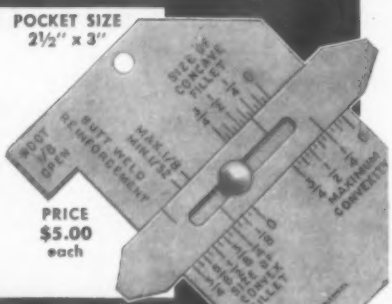
a one-piece rotor and shaft. It is available in four speeds—4,500 through 12,000 r.p.m. and comes in butterfly, grip and lever type throttles.

Circle No. 173 on Reader Service Card.

USE THIS "*Quick and Easy*"
PALMGREN WELD GAUGE
for accurate calibration of Butt and Fillet Type Welds

Meet exacting specifications of butt and fillet type welds with the Palmgren "easy to use" weld gauge. Precision built of chromium steel with dimensional readings clearly indicated, this handy, pocket size tool will help you eliminate rejections and save time and electrodes. It will accurately check sizes of convex or concave fillets as well as permissible tolerances of butt weld reinforcements. Conforms to A.W.S. specifications. Every production welder should have this weld gauge in his pocket. Order several for your shop today.

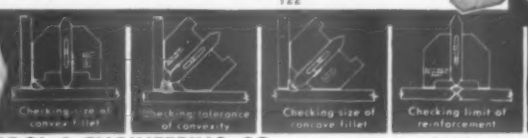
POCKET SIZE
2½" x 3"



PRICE
$5.00
each

122

USED MANY WAYS


Checking size of convex fillet
Checking tolerance of convexity
Checking size of concave fillet
Checking limit of reinforcement

CHICAGO TOOL & ENGINEERING CO. • 8373 South Chicago Ave., Chicago 17, Ill.

Circle No. 20 on Reader Service Card.

WHY *triple-guard* WELDING GOGGLES?

MODEL 492

1. Outside Protection
SOFT-VINYL form-fit FRAME — black opaque . . . hugs contours of face and nose, closes all gaps against light and other eye hazards.

2. Direct Eye Protection
50 mm GLASS Federal Specification FILTER LENSES . . . absorb harmful ultra violet and infra red rays.

3. Inside Protection
Inside Cover Lens protects eyes from splinters if impact breaks filter lens.

plus **STAC-VENT light-tight VENTILATION**

Quality Eye Protective Equipment *Made by the Leaders in Plastics*

WATCHEMOKET OPTICAL CO., INC.

232 West Exchange St. PROVIDENCE 3, R. I. *In Canada: Levitt-Safety Limited, Toronto 10, Montreal 26*

Circle No. 88 on Reader Service Card.

Grinding Wheel Bond

Recently announced by Simonds Abrasive Company is the new IL Bond which is said to give grinding wheels fast cutting action of softer grades with long wear of hard wheels. The bond acts as an internal lubricant which aids in increasing the abrasive cutting action of resinoid bonded wheels.

Circle No. 174 on Reader Service Card.

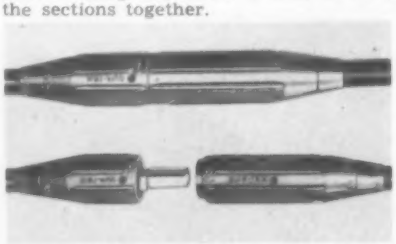
Improved Cable Connectors

"Quik-Trik" is the name of a new cable connector introduced by Jackson Products.

New Neoprene rubber insulators, built around steel sleeves, have tapered ends to stretch snugly over welding cable. They are said to lock out moisture, oil and dirt. They will not break nor catch against obstructions.

No capital equipment is needed for installation, nor is vulcanizing required. An Allen screw is loosened, insulator slid off and slipped over the cable end. Then cable is connected as usual, insulator is slid back and tightened.

Inside, two copper alloy sections are tapered together for greater metal-to-metal contact in a quickly detachable connection. With a twist of the hand, a steel locking bar rides a cam to lock the sections together.

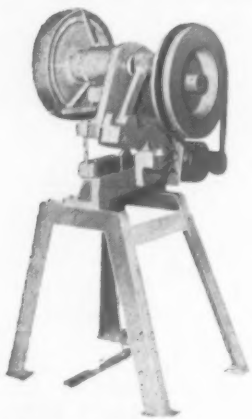


Model 2/0-R takes cables 1/0 and 2/0, with mechanical, soldered or brazed connections. Model 4/0-R takes cables 3/0 and 4/0, soldered or brazed connections only.

Circle No. 42 on Reader Service Card.

LOW-COST ANGLE & FLAT IRON CUTTER

BATEMAN POWER SHEAR



The only Power Shear of its kind on the Market today . . . now in 2 Models.

Model No. 2 (shown at left) cuts 2" x 2" x ¼" angles and 2" x ¼" flats. Has blades and punches for Ornamental iron, Channel 1", Squares ¾" and hand rail.

NO GRINDING NECESSARY AFTER CUT
ONE STROKE CYCLE CLUTCH OPERATES
BY HAND OR FOOT
FLYWHEEL WITH GEAR DRIVE FOR POWER
TAKES ONLY 2' by 27" FLOOR SPACE

Bateman Power Shear Model No. 2, with punch, ¾ hp motor and stand.....$575.00
(FOB Mineral Wells, Texas)
Shipping weight: 645 lbs.

WRITE today for complete information and name of nearest distributor.

Bateman Foundry and Machine Co. **Mineral Wells, Texas**

Circle No. 12 on Reader Service Card.

Rugged simplicity for industrial gas flow control

The New K-G FLOWMETER REGULATOR

Designed to give you accurate volume control of your shielding gas . . . yet provide ruggedness to withstand more than normal abuse on the job.

Result: New simplicity, greater gas control efficiency . . . when you specify K-G.

Order now . . . your K-G distributor is at your service. Call him, or write K-G for complete information.

the K-G equipment company, inc.
a unit of Air Products, Inc.
PO Box 538 Allentown, Penna.

Circle No. 44 on Reader Service Card.

Neck Flange

A new flange designed to exert greater pressure near the bore to overcome seal leakage, and to prevent overstressing of cast iron or semi-steel flanges when bolted, has been announced by Tube Turns. Rated at 125 lb. for oil, water and gas service, the flange is available in 1" through 12" sizes bored to match .188" and 250" wall pipe in sizes 4" through 12" within allowable mismatch.

Circle No. 81 on Reader Service Card.

Monel Welding Electrode

A new all-purpose Monel arc welding electrode known as Mon-Alloy has been announced by The McKay Company. Used with DC reverse polarity current, the new electrode is said to operate with smooth and quiet arc action and with a minimum of spatter loss. A specially balanced molten slag provides good fluxing and wetting action when welding commercial grades of Monel or carbon steel. Normally used without preheating work, Mon-Alloy deposits exhibit high mechanical properties without porosity or cracks.

Circle No. 177 on Reader Service Card.

Taper Face Welding Silver Alloy Paste

A new high silver content alloy blended with special flux in convenient paste form is now available from Eutectic Welding Alloys Corporation. Recommended for preplacement, tinning, filling, overlaying and joining, Eutec-Sil-Weld 1618 is applied with brush or spatula and flows readily by capillary action without leaving "islands." Applicable on most metals, 1618 develops shear strengths up to 125,000 psi and bonds at lower temperatures than normal silver alloys.

Circle No. 178 on Reader Service Card.

For Whatever Purpose You Fabricate

ALUMINUM . . .

Joining materials exactly suiting your needs are immediately available from ALL-STATE's largest selection of alloys and fluxes for welding, brazing and soldering ALUMINUM.

FREE DATA FOR WISEST SELECTION OF ALLOYS AND FLUXES TO WELD, BRAZE, SOLDER ALUMINUM

Ask Your ALL-STATE Distributor for Copies of the Aluminum Chart.

ALL-STATE WELDING ALLOYS CO., INC., WHITE PLAINS, N. Y.

Circle No. 5 on Reader Service Card.

ARCOS announces . . .

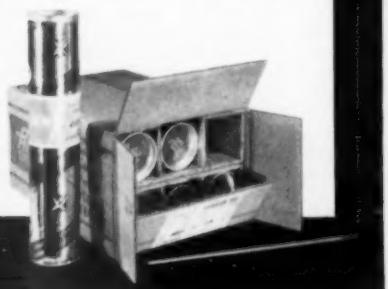
new easy-to-use DC electrodes

THE AEROCOR SERIES

Especially developed for DC reverse polarity welding of stainless sheet metal. Available in the following types: 308, 309, 310, 316, 347, 349, 410; sizes 1/16" to 1/8" dia.

THE FABRICOR SERIES

Especially developed for DC reverse polarity welding of heavy stainless. Available in the following types: 308, 309, 310, 316, 347; sizes 1/16" to 1/4".



Good news for every user of stainless electrodes

AEROCOR and FABRICOR identify America's newest DC welding electrodes.

To users they offer an opportunity for faster, easier welding. They've been especially designed for quality welds with the benefits and properties you want most.

For example, on every job, AEROCOR and FABRICOR Electrodes offer you these advantages:

- **Excellent arc action**
- **"Drag-type" welding technique**
- **Little or no spatter**
- **Superior washing action—good contours, sound penetration**
- **Smooth, even-rippled weld beads**
- **Slag that chips off quick and easy**

AEROCOR and FABRICOR are manufactured to the same high standards as all ARCOS Stainless Electrodes. And they're packaged in the famous Arcos ELECTROPAK — the easy-to-open-and-reseal container that protects against moisture pick-up and chipped coatings. Both series are identified by a bright orange colored label. Available through your Arcos representative or distributor.

FREE PERFORMANCE TEST

See the results in your own plant. Compare the performance of these new ARCOS Electrodes to what you're now using. Just drop us a line on your company letterhead and we'll arrange a demonstration. No obligation, of course.

More than ever it pays to . . . **WELD WITH** ARCOS

ARCOS CORPORATION • *1500 South 50th Street • Philadelphia 43, Pa.*

Circle No. 10 on Reader Service Card.

Beam Power Tube

Availability of a new tube designed for use either as an RF amplifier and oscillator or as an Af power amplifier and modulator, in both mobile and fixed equipment, has been announced by Amperex Electronic Corp. Designated Type 6146, high power sensitivity sensitivity and high efficiency are claimed for the tetrode. Plate dissipation is 20 watts and 25 watts under CCS and ICAS conditions respectively. Maximum ratings apply up to 60 Mc, reduced ratings up to 175 Mc.

Single 6146's have 52 watts maximum output as Class C amplifiers, 82 watts as Class AB_1 push-pull amplifiers, and 90 watts as Class AB_2 amplifiers.

Circle No. 164 on Reader Service Card.

Fog-Free Safety Goggle

Featuring a perforated and plated ventilator of special shape to catch and trap air circulation, a new No. 421 goggle announced by Sellstrom Mfg. Co. is said to reduce chances of fogging. Ventilator is permanently riveted to cup and is capable of circulating air from any direction.

Circle No. 180 on Reader Service Card.

Largest Capacity Blowpipe

A new hand-cutting blowpipe featuring separate lines for preheat and cutting oxygen which permits cutting thicknesses up to 55 inches in a single pass, has been introduced by Linde

Air Products Company. Known as Oxweld C-63, the new unit utilizes a cartridge-type mixer which provides thorough and uniform gas mixing, with little danger of flashbacks. Valves are separate from main body of blowpipe for ease of operation and maintenance.

Circle No. 181 on Reader Service Card.

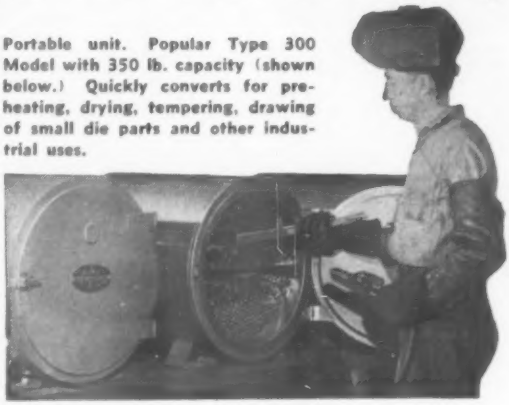
Protect Weld Rods The "DRY-ROD"® Way

Your cheapest insurance against wasteful, defective welds is Dry-Rod. Protects low-hydrogen, austinetic, other special alloy electrodes, and the new iron powder contact rods, against moisture.

DryRod promotes steadier welding with less slowdown — reworks — scrap. Pays for itself out of rod salvage alone. Less than 15c per 24-hour operating cost.

Completely wired, ready for use. Automatically controlled temperatures adjust from 175° to 550°. F. for storage or rebaking.

Two sizes available. 10 lb. capacity Portable unit. Popular Type 300 Model with 350 lb. capacity (shown below.) Quickly converts for preheating, drying, tempering, drawing of small die parts and other industrial uses.



For details, see your Welding Supply Dealer or write:

DR-23

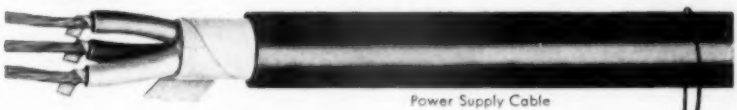
Dry® Rod Div. of Phoenix Products Co.

4731 N. 27th St., Milwaukee 9, Wis.

Circle No. 65 on Reader Service Card.

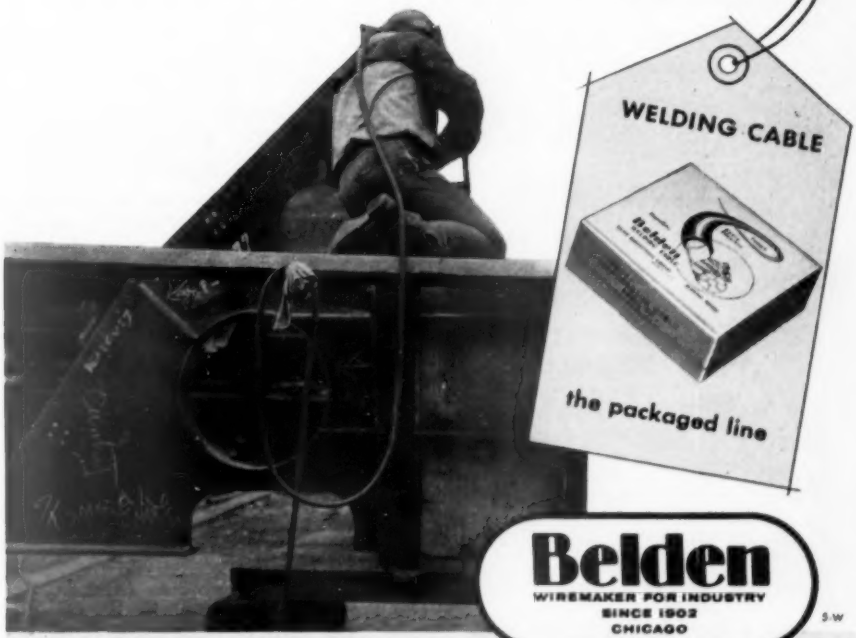
Power Supply Cord

If it's worth engineers' time...



Power Supply Cable

...it's worth engineered cable



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WIREMAKER FOR INDUSTRY
SINCE 1902
CHICAGO

S-W

Magnet Wire • Lead and Fixture Wire • Power Supply Cords, Cord Sets and Portable Cord • Aircraft Wires
Welding Cable • Electrical Household Cords • Electronic Wires • Automotive Wire and Cable

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WESPO

WELDING
TOGGLE
PLIERS

QUICK TRIGGER RELEASE
TOGGLE PLIER

Movement of trigger in either direction releases pressure on plier.

Heat-treated alloy steel forgings.

Hardened rivets and bushings at all pivot points.

Double-ribbed, forged jaws, for greater strength.

MIDGET
TOGGLE PLIER

Compact, for use in restricted areas or where extreme holding pressures are not required.

Heat treated alloy steel forgings—corrosion resistant-rust proofed. 5 1/16" long—1 3/16" Jaw.

Send for Catalog Sheet and Prices.

WEST POINT MFG. CO.
26949 WEST 7 MILE ROAD
DETROIT 19, MICHIGAN

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OPPORTUNITIES

Rates: $25 per column inch. $10 per column inch for "Position Wanted" ads. Payment must accompany order.

MANUFACTURERS REPRESENTATIVES WANTED to sell nationally known line of welding accessories. Indicate what States you are currently covering. For further details please write. Reply to Box 2157, INDUSTRY & WELDING Magazine, 812 Huron Rd., Cleveland 15, Ohio.

WOULD YOU WELCOME EXTRA INCOME?

Are you calling on Metal-Working Industries? Then our New Technical Information Service indispensable to Plant Engineers and Management is your answer. Write at once with details to Box 2257, INDUSTRY & WELDING Magazine, 812 Huron Rd., Cleveland 15, Ohio.

SALES MANAGER WANTED

Distributor of new precision flame cutting machine requires experienced man to head up nationwide sales and service. Reply to Box 2357, INDUSTRY & WELDING Magazine, 812 Huron Rd., Cleveland 15, Ohio.

Air Reduction Acquires Jackson Products

J. H. Humberstone, president of Air Reduction Sales Company, a division of Air Reduction Company, Incorporated, has announced the company's acquisition of the assets and business of Jackson Products, Inc. of Detroit. Mr. Humberstone said that the present distribution channels will be maintained.

Mr. Jackson, who founded Jackson Products over 20 years ago, will continue his connection with the organization in an advisory capacity, Mr. Humberstone said. A. C. Gilbert has been named general manager.

Richards Joins O.K.I.

James W. Richards has joined the Sales Force of O.K.I. Welding Supply Co., of Cincinnati, Ohio. He will act as a specialist on the sales and service of gas welding and cutting equipment.

THERMO Spiral

—the ONLY Tip Cleaners that GUARANTEE These OUTSTANDING Advantages

- Lessened carbon and slag removed **without** scratching or enlarging orifice.
- Left-hand spiral cleaning ridges clean and burnish old tips to **new** tip efficiency.
- Have no breakage points caused by grooves running horizontally.
- It's the ONLY Tip Cleaner with uniformly rounded cleaning ridges.
- Locked in compact case to prevent damage. Standard set of 12 cleans 27 drill sizes.
- FREE replacement of **any** tip in normal use.

Once you use THERMO Tip Cleaners, you'll never switch to any other make.

All Progressive Welding Supply Dealers stock THERMO Tip Cleaners

THERMACOTE Company

108 S DeLacey Ave. PASADENA CALIFORNIA

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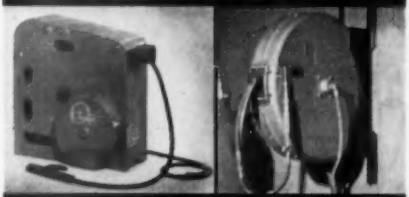
WELDREEL

Welding Hose Reels

Arc Welding Cable Reels



PREVENT ACCIDENTS

CUT LABOR COSTS

EXTEND HOSE AND CABLE LIFE

EASY TO OPERATE

CAN BE USED ANYWHERE

Write today for literature

UNITED SPECIALTIES, INC.

EL DORADO, ARKANSAS

WELDREEL ®

Circle No. 82 on Reader Service Card.

Thermacote Moves To California

Robert Vailancourt has purchased the Thermacote Company, formerly a subsidiary of Holiday Plastics, Inc., Kansas City, and has moved the factory and general offices to 108 South DeLacey Avenue, Pasadena, California.

Two new branch offices have also been opened in the East, one at 430 South Sixth Street, Brooklyn, New York, and another at Atglen, Pennsylvania (Philadelphia suburb).

New Victor Plant

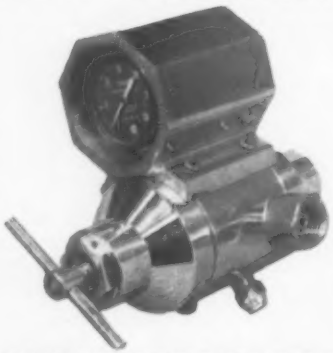
The new Victor Equipment Company, Alloy Rod and Metal Division, plant at Norwalk, California, is said to represent approximately 40,000 sq. ft. of the most modern and up-to-date facilities for the manufacture of hardfacing rod and other products.

Everything possible has been incorporated in this plant to make it one of the most up-to-date manufacturing units of its kind in existence.

PATENTED

OXO

SAFETY REGULATORS



AMERICA'S LEADING INDUSTRIES ARE BUYING THESE REGULATORS

FOR ONE REASON . . .

They are the Best!

Regulators for Every Need

OXO EQUIPMENT CO.

CEDAR and OAK STREETS
NEW LENOX, ILLINOIS

Circle No. 62 on Reader Service Card.

a NEW product means NEW time saving and important NEW production gains

York's

SPAT-R-PRUF COMPOUND 106

don't sputter about spatter . . .
JUST WIPE IT OFF

Completely eliminates grinding after welding. Just one coat, and spatter can be wiped away with a dry cloth.

- NO STIRRING OR DILUTION
- NON-TOXIC
- NON-INFLAMMABLE
- NO ODOR
- HARMLESS TO SKIN
- PERFECT PAINT BASE
- HELPS PREVENT RUST
- NO WELD POROSITY

Available 1 or 5-gal. cans, 55-gal. drums

3 in 1 York's '77'
SPECIAL FLUX
FOR GENERAL BRAZING
FOR CAST IRON WELDING
FOR CAST IRON BRAZING

YORK ENGINEERING COMPANY
2711 S. Kedzie Ave. Chicago 23, Ill.

Circle No. 101 on Reader Service Card.

Morton Appoints Two

Appointment of Henry W. Kreifeldt as Sales Manager for Morton Mfg. Co., Muskegon Heights, Mich., has been announced by Matt H. Morton, secretary-treasurer. At

KREIFELDT

MITCHELL

the same time, Mr. Morton announced appointment of Oakley B. Mitchell as Purchasing Agent.

Air Products Acquires Steele Gases, Chicago

Air Products, Incorporated, Allentown, recently acquired the assets of Steele Gases, Incorporated, Chicago. The announcement made by Leonard P. Pool, president of Air Products.

'ANTI-BORAX' FLUXES

Safe, Non-Toxic

BETTER WELDS • CLEANER WELDS
STRONGER WELDS

No. 1 Cast Iron Welding Flux
No. 2 Brazing Flux for Brass, Bronze, etc.
No. 4 "Braz-Cast" Flux for Bronze Welding Cast Iron
No. 5 Aluminum Flux for Cast Aluminum
No. 8 Aluminum Flux for Sheet Aluminum
No. 9 Stainless Steel Welding Flux
No. 11 Tinning Compound
No. 15 Welding Flux for Magnesium Alloys
No. 16 Silver Solder Paste Flux for Silver Brazing

Manufactured Only By
ANTI-BORAX COMPOUND CO., INC.
FORT WAYNE INDIANA

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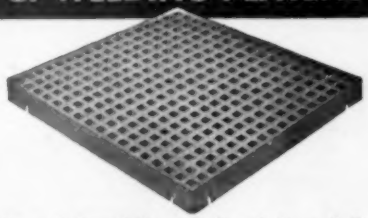
Circle No. 1 on Reader Service Card.

BENDING BLOCKS or WELDING PLATENS



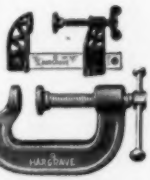
4 ft. x 4 ft.—5 ft. x 5 ft.—5 ft. x 6 ft. Also other sizes. Cast steel blocks for layout, welding and assembly. Tools, stands and accessories. Write today for information.

ACORN IRON & SUPPLY CO.
Delaware Ave. & Poplar St. Philadelphia 23, Pa.

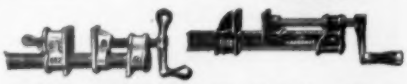
WELDERS' CLAMPS

Individually Power-Tested for Better Performance

The most complete line of clamps. Stock sizes from ¾ in. to 12 ft. openings ½ in. to 16 in. deep.



WRITE FOR FREE CATALOG



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1985 Waverly Ave., Cincinnati 12, Ohio
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Your Guide to Better Protection, Comfort and Economy

Flood Always
FINEST QUALITY FAIRLY PRICED

FIBER GLASS HELMET
Strong, light weight, easy to clean—with fiber or all plastic, ratchet-type head gear.

FACE SHIELD
Offers complete face protection. Fiber Crown. Easy window replacement.

AT YOUR DISTRIBUTOR OR WRITE:

FLOOD SAFETY PRODUCTS CO.
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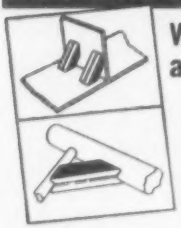
Aronson TWINNER
MAGNETIC CLAMPS



Welding Aids with a Thousand uses!

Aronson MACHINE CO.
ARCADE, NEW YORK

JEWEL PIPE CLAMPS

For fast, Accurate Pipe Welding. Sturdy construction for hard usage. Aligns and holds pipe for tacking. Two sizes: ½" to 8" and 8 to 16".
Write for details
JEWEL MANUFACTURING CO.
1841 University Ave. St. Paul 4, Minn.

Circle No. 43 on Reader Service Card.

FLUXINE

Fluxes for Welding Brazing Silver and Soft Soldering

KOP-R-ARC Coated Rods

60 years of experience in scientific development in welding

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Planning welding program are (left to right) David P. O'Connor, John R. Ross, C. B. Smith and Charles W. Concannon, A.W.S. Metal Congress program chairman.

Western Metal Congress Plans Welding Sessions

Charles W. Concannon, sales manager, Absco Inc., is chairman of a committee which is formulating technical programs for sessions by Los Angeles Section, American Welding Society at the Tenth Western Metal Congress, Mar. 25-29 in the Los Angeles Ambassador hotel.

Others on the committee are David P. O'Connor, senior machinist foreman, Department of Water and Power; John R. Ross, west coast sales manager, silver brazing division, American Platinum Works, and C. B. Smith, supervisor of materials and processing engineering, Douglas Aircraft.

Also on Mar. 25-29, the Tenth Western Metal Exposition, with many exhibits of new welding technique, will be held in Los Angeles' Pan-Pacific Auditorium.

M & T Opens Seattle Office and Warehouse

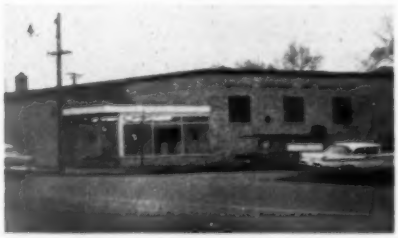
Metal & Thermit Corporation has established a sales office and warehousing facilities for the products of its welding division at 2739 First Ave., South, in Seattle, Washington.

Distributor-Manufacturer Celebrates Plant Opening

Opening of ultra-modern plant and offices was celebrated recently with a three day house warming and New Year's Eve party by the Welding Equipment and Supplies Company, Detroit, Michigan, distributors of welding machines, supplies and accessories, and manufacturers of Eureka tool and die welding electrodes. Some 5,000 visitors toured the more than 30,000 sq. ft. plant, which provides more than three times the area formerly occupied, according to company president, A. R. Butler (above left.)

Facilities include spacious warehouse for efficient handling of customer requirements, a large and attractive display room, a welding research department for job proving and experimentation, and controlled temperature rooms for manufacturing Eureka welding electrodes.

Company sales department is headed up by P. S. Doyen, sales manager (above, right) and A. E. Kemp, assistant sales manager.



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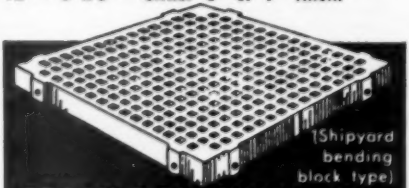

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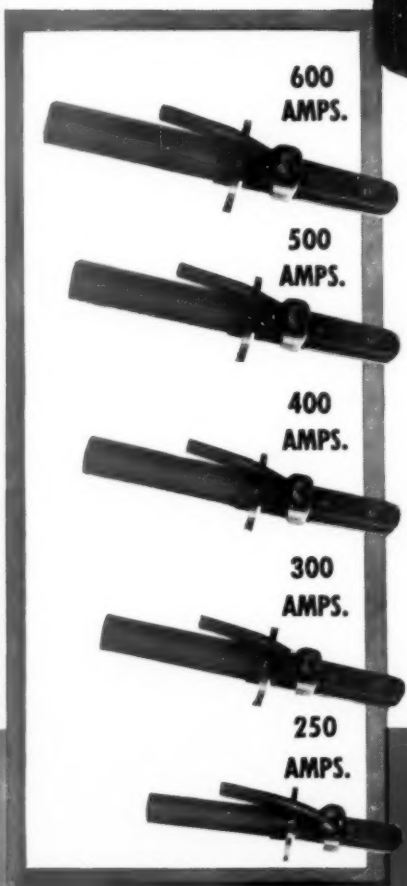

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